GENERAL NOTES

Specifications: Latest S.H.A. Specifications and Special Provisions for materials and construction. Latest A.A.S.H.T.O. Standard Specification for Highway Bridges for design. For reinforced concrete design, fc=1200 lbs. per sq. in.

Concrete: All concrete for crib wall shall be Mix. No.3 (3500 p.s.i.).

Chamfer: All exposed corners of crib wall units shall be chamfered ½" x ½" except do not chamfer ends of all stretchers.

Reinforcing Steel: Reinforcing steel shall conform to ASTM A-615 Grade 60. Minimum cover for any bar in crib wall units shall be 1". Steel shall be symmetrically placed.

Excavation: See Below.

Crib Walls: These wall sections are based upon reaching satisfactory bearing ** with a minimum of excavation. However, should the Engineer direct that the wall start at a lower elevation than planned, then the height of the wall may cause the section to change from A to B, B to C or C to D.
All "TOP OF WALL ELEVATIONS" and "TOE OF WALL ELEVATIONS" are level. All bearing blocks are 5¾" thick set in mortar. When rock is encountered, rock shall be removed to 1'-0" minimum depth below bottom of cribs, as necessary for leveling and bearing members (stretchers) are to be set in 1:3 mortar at the time the wall is erected. Closed face crib walls are shown on all details for exposed cribbing. If open face crib wall is called for, stretchers shall be open face type.

Expansion Joints: Walls shall be separated into sections every 90'± ft. by provision of double rows of headers.

Backfill: Shall progress simultaneously with the erection of the cribbing. The material shall be gravel, crushed stone or other granular material approved by the Engineer.
The material shall be placed in 8 in. layers and tamped or otherwise consolidated to the satisfaction of the Engineer. Care shall be exercised in placing the backfill so that the cribbing is not damaged.

Note:
See Plans and/or Special Provisions for Type of Wall (open or closed face).

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 8/27/79

REVISIONS	
SHA	FHWA
4-11-80	6-20-80
10-1-82	6-8-90
1-22-01	·
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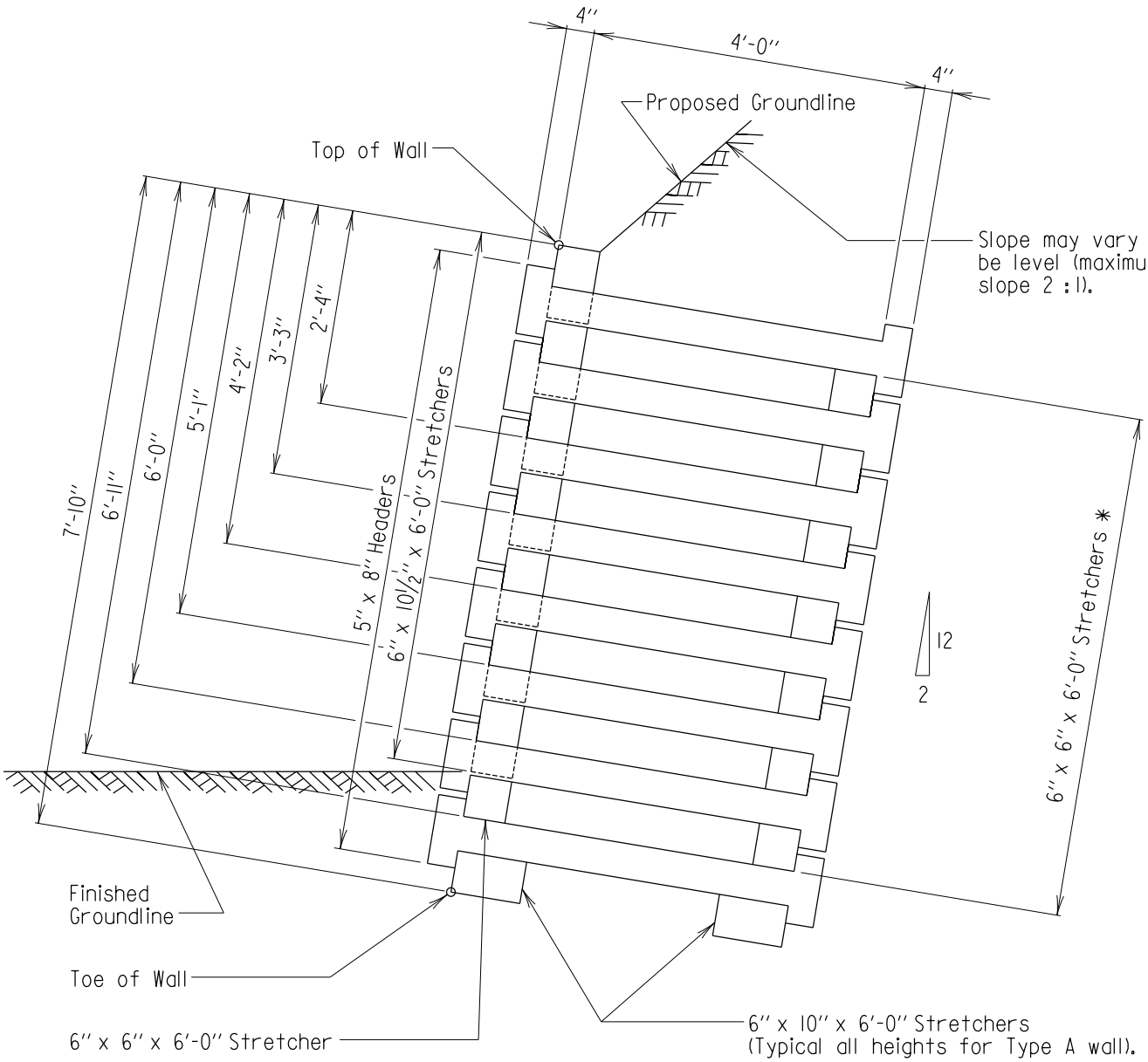
FHWA APPROVAL
DATE: 1-16-80

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

CRIB WALLS - GENERAL NOTES

STANDARD NO. RW(6.01)-79-18 SHEET 1 OF 7

RETAINING WALLS



* If open face wall, use this size in front face.

SECTION

Scale : ½'' = 1'-0''

Note:
In using this section the drawing shall be read from top down until desired height is reached.

APPROVAL
E.S. Friedman DIRECTOR OFFICE OF STRUCTURES
DATE: 8/27/79

REVISIONS	
SHA	FHWA
1-22-01	·
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FHWA APPROVAL
DATE: 12-19-79

STATE OF MARYLAND
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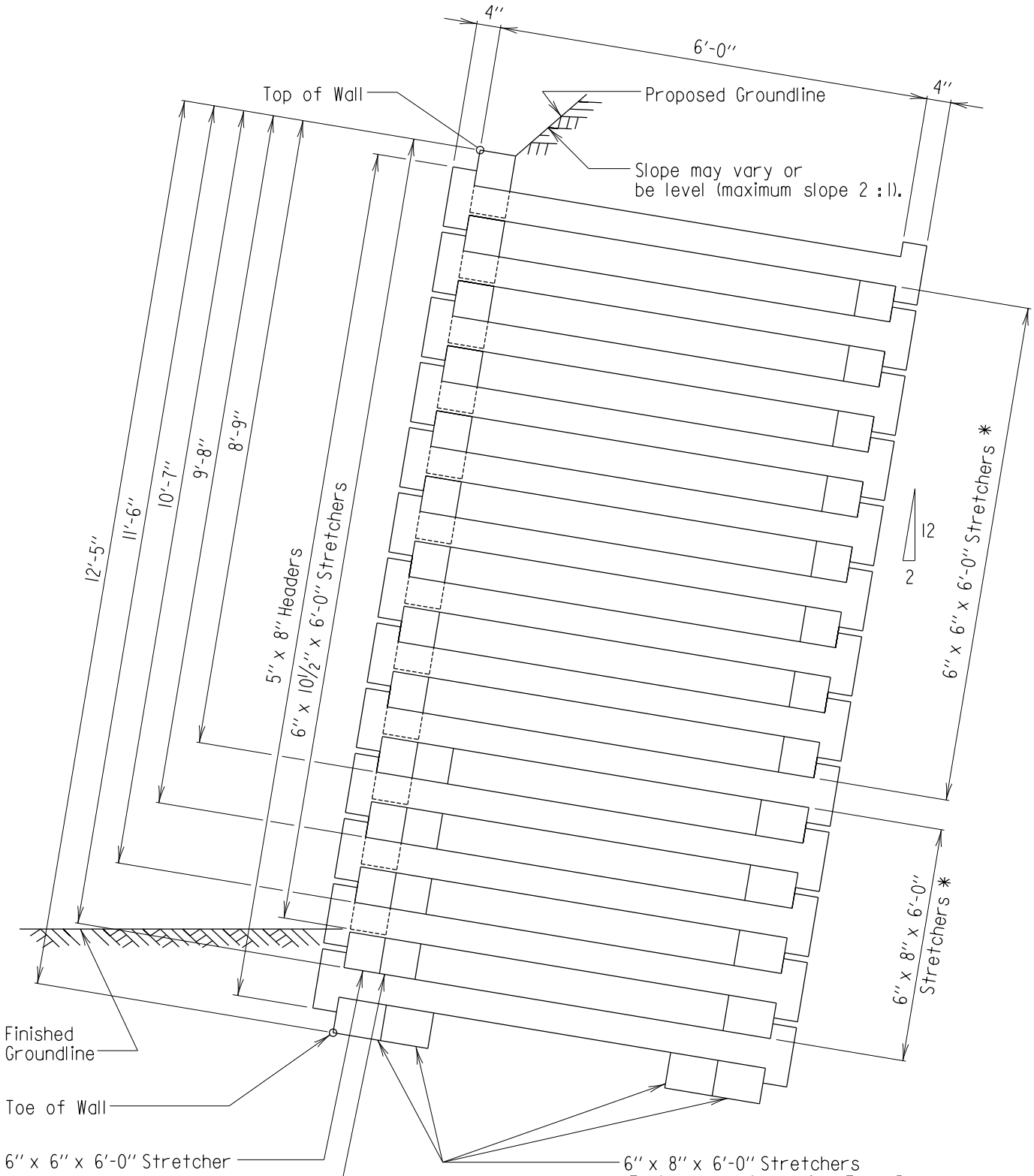
CRIB WALL SECTION - TYPE A

STANDARD NO. RW(6.01)-79-18

SHEET 2 OF 7

RETAINING WALLS



SECTION

Scale : ½'' = 1'-0''

* If open face wall, use this size in front face.

Note:
In using this section the drawing shall be read from top down until desired height is reached.

APPROVAL
E.S. Friedman DIRECTOR OFFICE OF STRUCTURES
DATE: 8/27/79

REVISIONS	
SHA	FHWA
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FHWA APPROVAL		
DATE: 12-19-79	·	·

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
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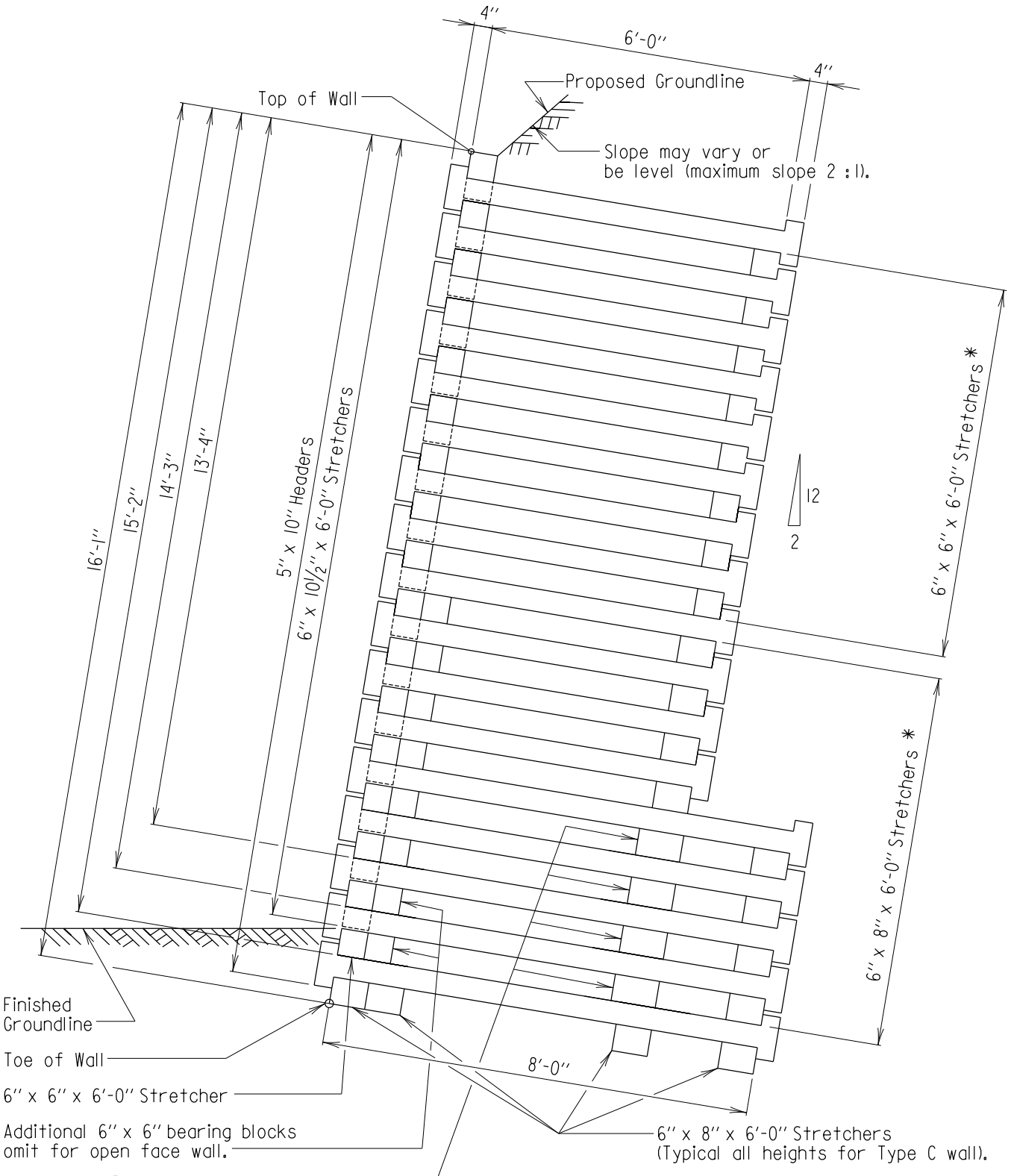
OFFICE OF STRUCTURES

CRIB WALL SECTION - TYPE B

STANDARD NO. RW(6.01)-79-18

SHEET 3 OF 7

RETAINING WALLS



SECTION

Scale : ⅜'' = 1'-0''

* If open face wall, use this size in front face.

Note:
In using this section the drawing shall be read from top down until desired height is reached.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 8/27/79

REVISIONS	
SHA	FHWA
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FHWA APPROVAL
DATE: 12-19-79

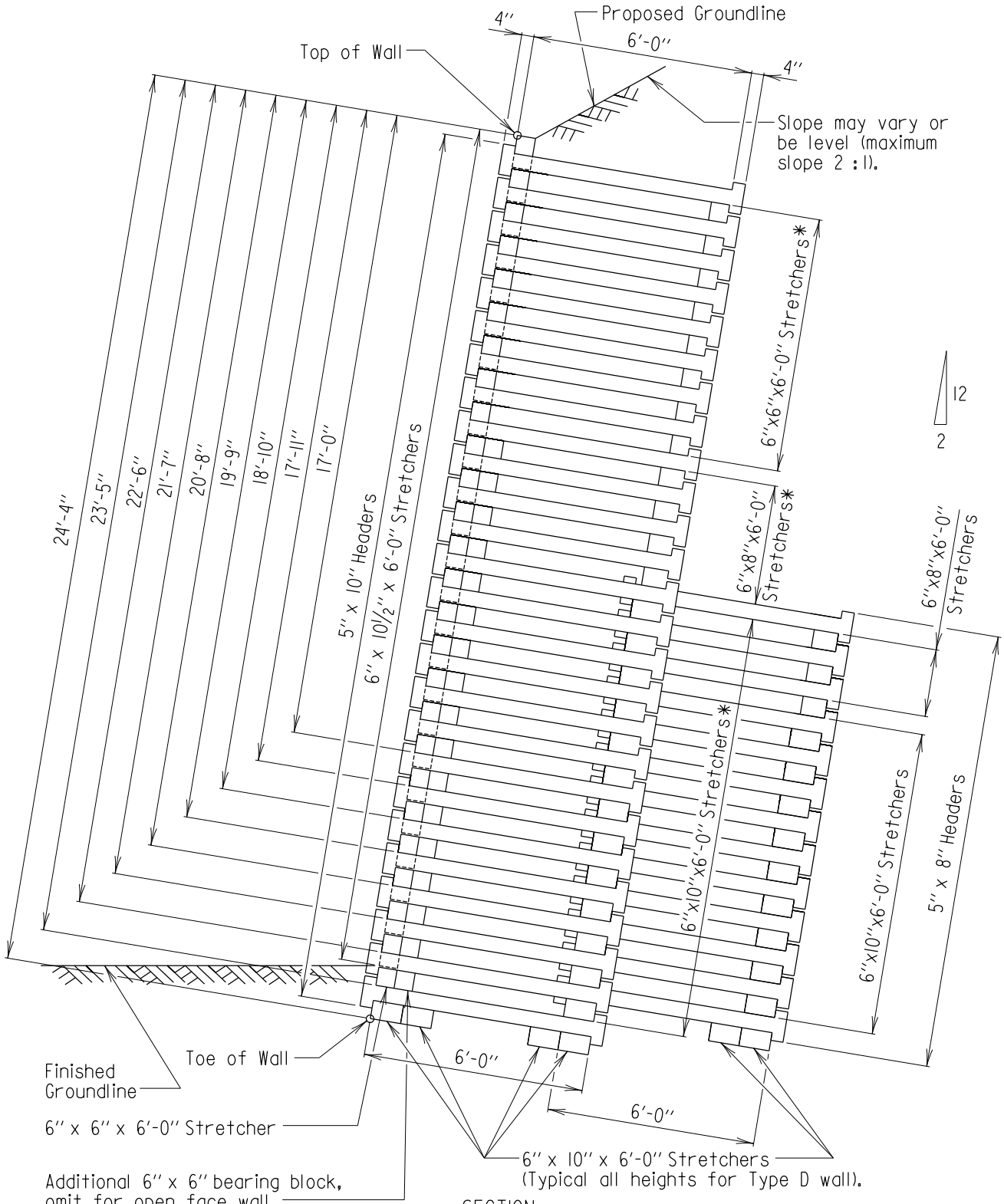
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

CRIB WALL SECTION - TYPE C

STANDARD NO. RW(6.01)-79-18

SHEET 4 OF 7

RETAINING WALLS



SECTION

Scale : ½'' = 1'-0''

* If open face wall, use this size in front face.

Note:
In using this section the drawing shall be read from top down until desired height is reached.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 8/27/79

REVISIONS	
SHA	FHWA
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DATE: 12-19-79	·	·

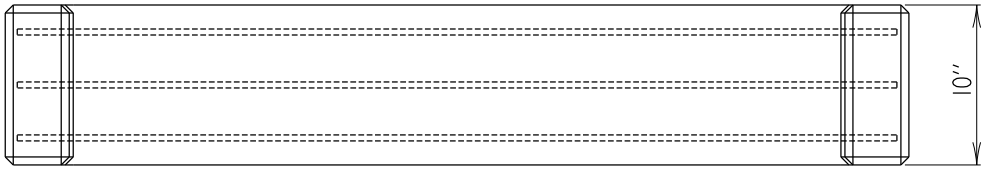
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

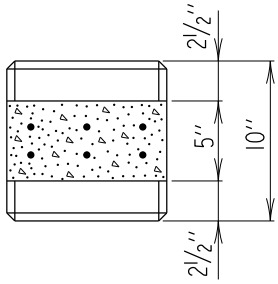
CRIB WALL SECTION - TYPE D

STANDARD NO. RW(6.01)-79-18

SHEET 5 OF 7

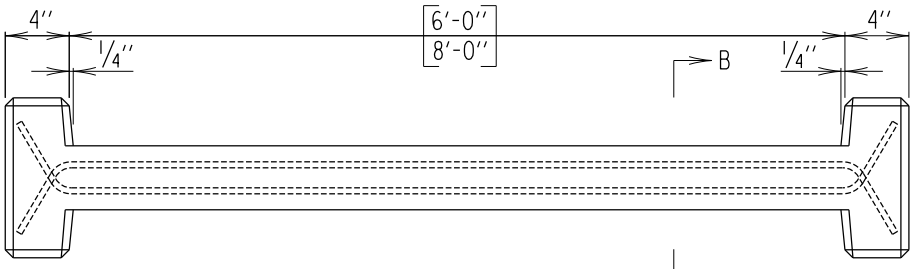
RETAINING WALLS





SECTION A-A

PLAN

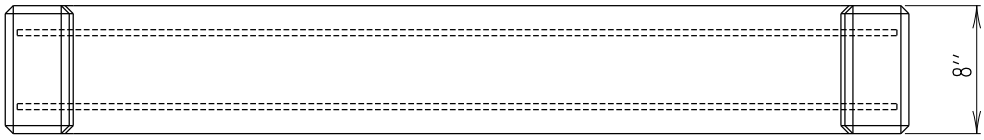


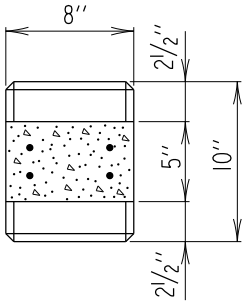
ELEVATION

B

5'' X 10'' HEADERS

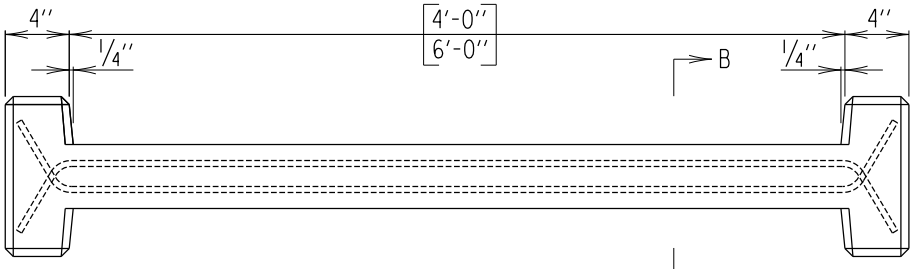
Scale : 1'' = 1'-0''





SECTION B-B

PLAN



ELEVATION

B

5'' X 8'' HEADERS

Scale : 1'' = 1'-0''

APPROVAL
C.S. Friedman DIRECTOR OFFICE OF STRUCTURES
DATE: 8/27/79

REVISIONS	
SHA	FHWA
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FHWA APPROVAL
DATE: 12-19-79

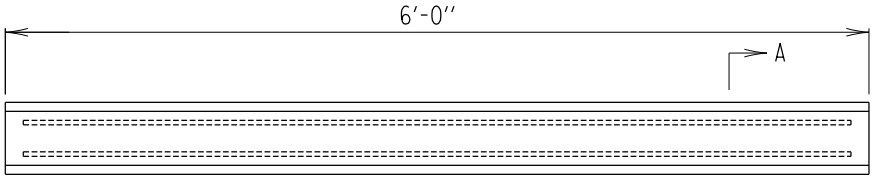
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

CRIB WALL -- HEADERS

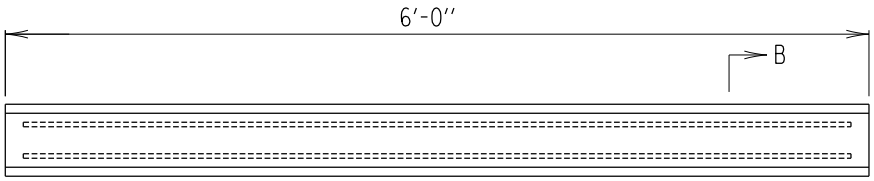
STANDARD NO. RW(6.01)-79-18

SHEET 6 OF 7

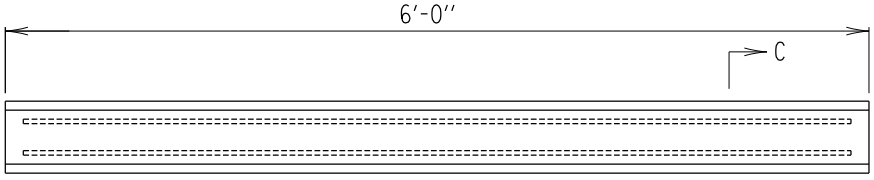
RETAINING WALLS



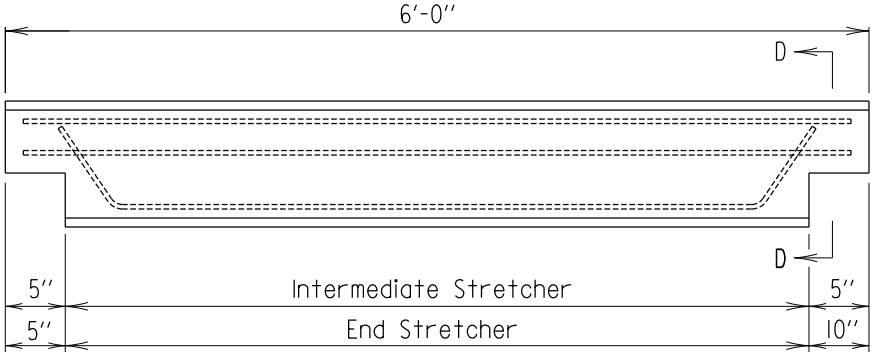
6" X 10" OPEN FACE STRETCHER



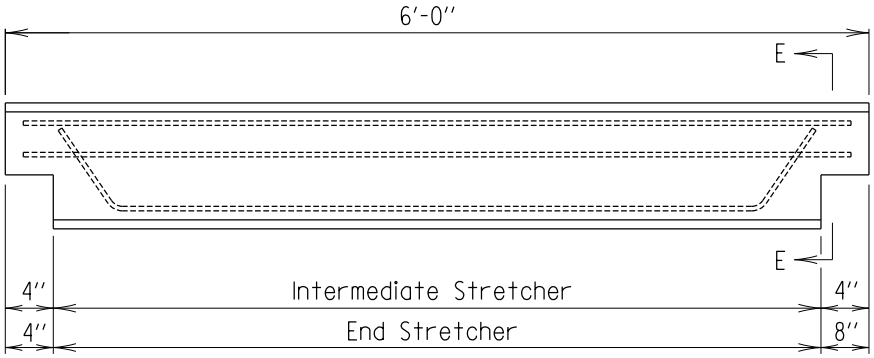
6" X 8" OPEN FACE STRETCHER



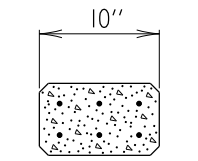
6" X 6" OPEN FACE STRETCHER



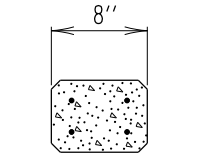
6" X 10½" CLOSED FACE STRETCHER FOR 5" X 10" HEADERS



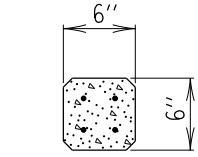
6" X 10½" CLOSED FACE STRETCHER FOR 5" X 8" HEADERS



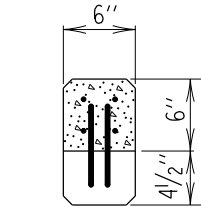
SECTION A-A



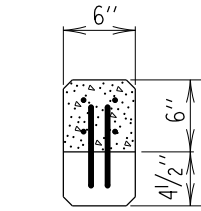
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E

Note:
All bars minimum #3 in size.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 8/27/79

REVISIONS	
SHA	FHWA
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FHWA APPROVAL		
DATE: 12-19-79	.	.

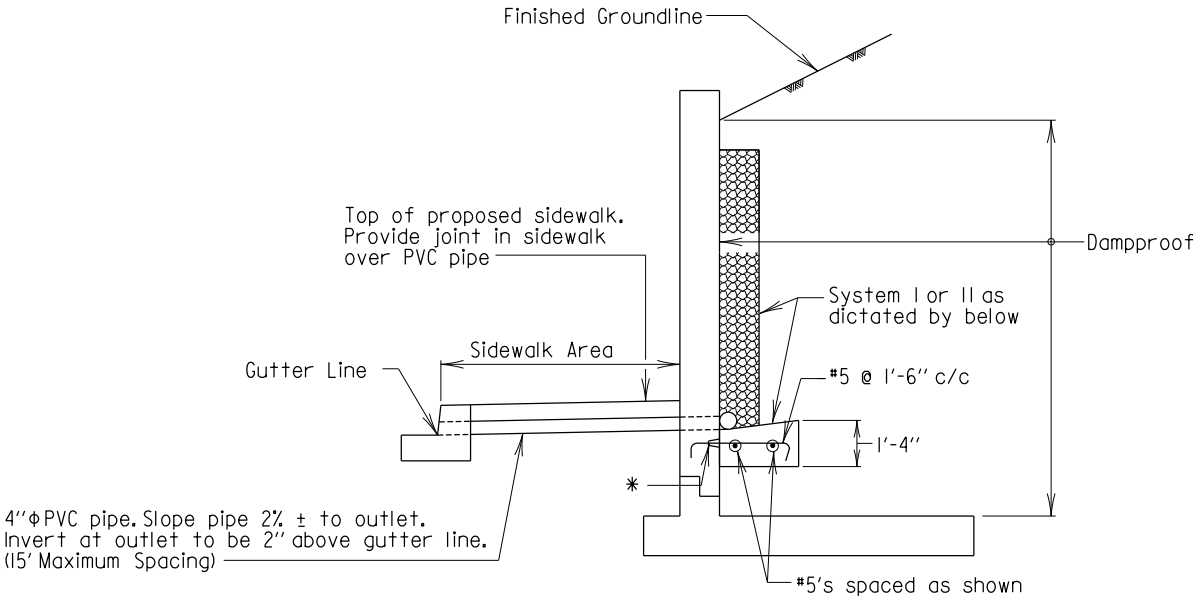
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

CRIB WALL -- STRETCHERS

STANDARD NO. RW(6.01)-79-18

SHEET 7 OF 7

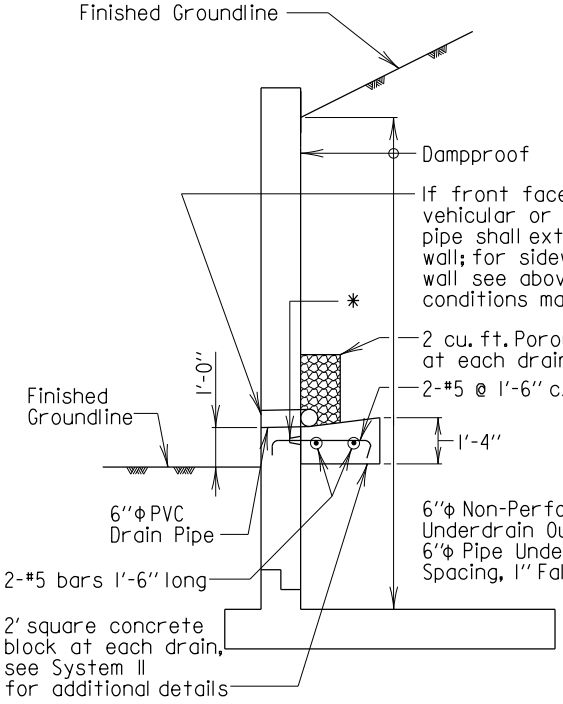
RETAINING WALLS

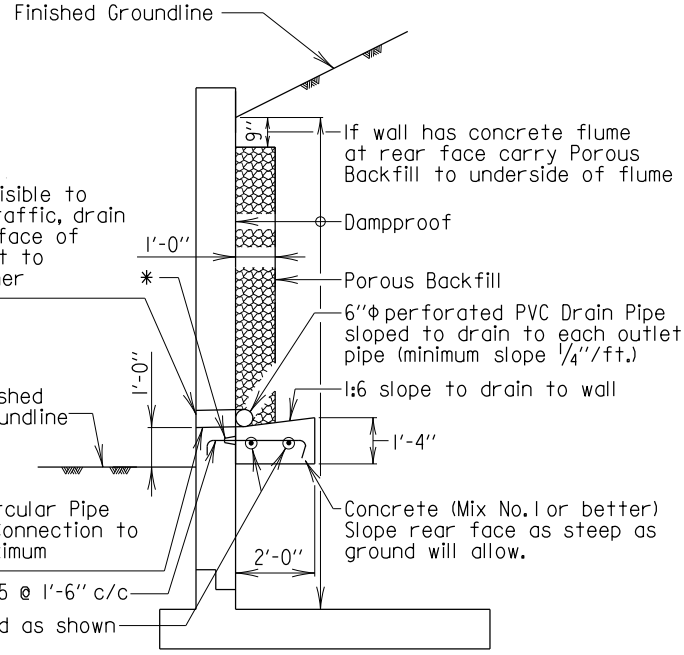


DRAIN AT SIDEWALK

Scale : None

* #5 Threaded Rebar Dowel Coupler at 1'-6" c/c.





This system shall be used for all box culvert wing walls and other wing walls that are both less than 30' long and less than 16' high (height of wall from bottom of footing to top of highest section). One drain shall be placed at ℄ of wall for all walls less than 15' long. For walls between 15' and 30' long, two drains shall be placed, one at each third point.

SYSTEM I

Scale : None

This system shall be used for all retaining walls, all wing walls (not in System I).

SYSTEM II

Scale : None

OTHER RELATED STANDARDS
REBAR-BD(2.21)-93-285
REBAR-PL(4.00)-93-286

Note:
1. Exact elevation of drain to be determined by Engineer in field.
2. Porous backfill (refer to Section 469).
3. Use this standard for bridges with wing walls that are not parallel to the highway. For bridges with wing walls parallel to the highway see Std. No. BR-SB(0.01)-80-101 sheet 5 of 5 for details.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 2/25/80

REVISIONS	
SHA	FHWA
11-17-97	·
4-22-98	·
12-14-98	·
1-22-01	·

FHWA APPROVAL
DATE: 6-20-80

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

RETAINING WALL AND WING WALL DRAINAGE SYSTEMS

STANDARD NO. RW(0.01)-80-100 SHEET 1 OF 1

RETAINING WALLS

GENERAL NOTES

Specifications:

-SHA Specifications dated July, 2008
-Revisions thereof and additions thereto and
Special Provisions for Materials and Construction

AASHTO LRFD Bridge Design Specifications, 5th edition, 2010.

Concrete Design: LRFD, f'c= 3.0 ksi.

Reinforcing Steel Design: fy = 60.0 ksi.

Concrete:

All structure concrete shall be Mix. No. 3 (3500 psi) except as noted below under reinforcing steel.

Reinforcing Steel:

Reinforcing steel shall conform to A 615, Grade 60. All splices, not shown, shall be lapped as per Bar Lap Charts. Minimum cover for any bar shall be 2" unless otherwise noted, with the exception of bars at the bottom and sides of all footings which shall have 3" minimum cover.

If the front face of a retaining wall less than 10 feet from the edge of paved surfaces, epoxy coated reinforcement shall be used in the front face of the stem and Mix. No. 6 (4500 psi) concrete shall be used for the stem.

ONLY GRADE 60 CAN BE USED.

Design Parameters:

Earth pressure calculated based on Coulomb Theory.

Angle of Internal Friction:
33 degrees for excellent soil
30 degrees for good and poor soils (and all walls on pile footings)

For Wall Types E and F, passive earth pressure from top of footing to bottom of shear key was utilized in the design. In these cases, the top of footing shall have a minimum of 30" cover.

Safe bearing pressures are factored resistances.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 7/8/83

REVISIONS	
SHA	FHWA
10-9-07	·
1-18-12	·
3-21-14	·
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FHWA APPROVAL
DATE: .

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

VERIFIED 10-9-2007 LRFD

STANDARD RETAINING WALL
GENERAL NOTES

STANDARD NO. RW(6.02)-83-133(L) SHEET 1 OF 1

RETAINING WALLS

GENERAL NOTES

Specifications:

-SHA Specifications dated January, 2001
-Revisions thereof and additions thereto and
Special Provisions for Materials and Construction

AASHTO Standard Specifications for Highway Bridges dated 1996, including all Interim Specifications thru 2000 (unless otherwise noted).

Concrete Design: Service load design method, fc = 1200 psi.

Reinforcing Steel Design: fs = 24,000 psi.

Concrete:

All structure concrete shall be Mix. No. 3 (3500 psi) except as noted below under reinforcing steel.

Reinforcing Steel:

Reinforcing steel shall conform to A 615, Grade 60. All splices, not shown, shall be lapped as per Bar Lap Charts. Minimum cover for any bar shall be 2" unless otherwise noted, with the exception of bars at the bottom and sides of all footings which shall have 3" minimum cover.

If the front face of a retaining wall less than 10 feet from the edge of paved surfaces, epoxy coated reinforcement shall be used in the front face of the stem and Mix. No. 6 (4500 psi) concrete shall be used for the stem.

ONLY GRADE 60 CAN BE USED.

Design Parameters:

Earth pressure calculated based on Coulomb Theory.

Angle of Internal Friction:
33 degrees for excellent soil
30 degrees for good and poor soils (and all walls on pile footings)

Minimum Reinforcement [AAHSTO LRFD] Pmin. = 0.03 fc'/fy.

For Wall Types E and F, passive earth pressure from top of footing to bottom of shear key was utilized in the design.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 7/8/83

REVISIONS	
SHA	FHWA
7-16-02	·
3-21-14	·
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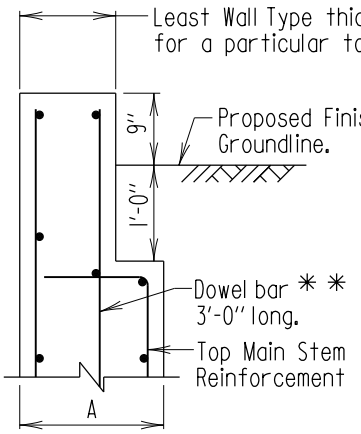
FHWA APPROVAL
DATE: .

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

STANDARD RETAINING WALL
GENERAL NOTES

STANDARD NO. RW(6.02)-83-133 SHEET 1 OF 1

RETAINING WALLS

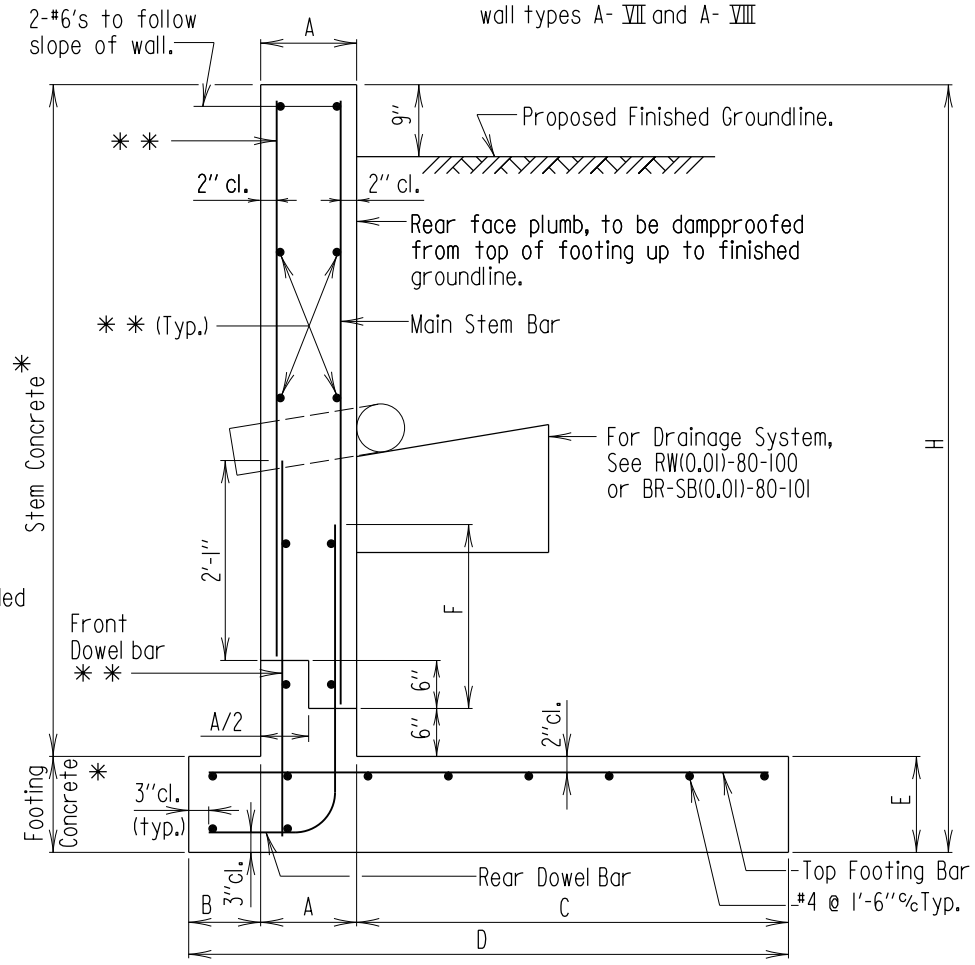


DETAIL A

Scale: None

(See note 2 below)

* * #4 @ 1'-6" c/c for
wall types A-I thru A-IV
#4 @ 1'-0" c/c for
wall types A-V and A-VI
#5 @ 1'-0" c/c for
wall types A-VII and A-VIII



TYPICAL SECTION

Scale: 1/2" = 1'-0"

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

Wall Type	H	A	B	C	D	E	F	Rear Dowel Bar	Main Stem Bar	Top Foot. Bar
A-I	6'-0"	1'-0"	9"	2'-0"	3'-9"	1'-0"	2'-2"	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c
A-II	8'-0"	1'-0"	9"	3'-3"	5'-0"	1'-0"	2'-2"	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c
A-III	10'-0"	1'-0"	9"	4'-6"	6'-3"	1'-3"	2'-7"	#6 @ 1'-0"c/c	#6 @ 1'-0"c/c	#6 @ 6"c/c
A-IV	12'-0"	1'-0"	9"	5'-6"	7'-3"	1'-3"	2'-7"	#6 @ 6"c/c	#6 @ 1'-0"c/c	#6 @ 6"c/c
A-V	14'-0"	1'-3"	1'-0"	6'-0"	8'-3"	1'-6"	3'-6"	#7 @ 6"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
A-VI	16'-0"	1'-6"	1'-0"	6'-9"	9'-3"	1'-6"	3'-6"	#7 @ 6"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
A-VII	18'-0"	1'-9"	1'-3"	7'-3"	10'-3"	1'-6"	3'-6"	#7 @ 6"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
A-VIII	20'-0"	2'-3"	1'-6"	7'-9"	11'-3"	1'-6"	4'-7"	#8 @ 6"c/c	#8 @ 1'-0"c/c	#8 @ 6"c/c

Notes:

1. An "Excellent Soil Condition" is that foundation material that can support a safe bearing pressure of 5 ksf and has an angle of friction of 33°.
2. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
3. Contractor has option of lapping main stem reinforcement with rear dowel reinforcement as shown; or by extending the rear dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
4. These walls are valid if traffic is present on the level area adjacent to the wall.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 6/8/83

REVISIONS	
SHA	FHWA
8-10-04	·
5-8-08	·
1-18-12	·
12-4-13	·

FHWA APPROVAL
DATE: 6-21-85

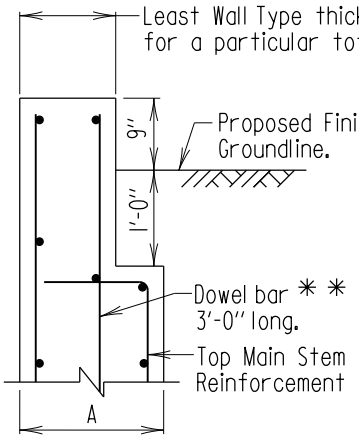
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

VERIFIED 5-8-2008 LRFD

TYPE A RETAINING WALL SECTION (FOR EXCELLENT SOIL CONDITION AND TWO FOOT SURCHARGE)

STANDARD NO. RW(6.03)-83-134 SHEET 1 OF 1

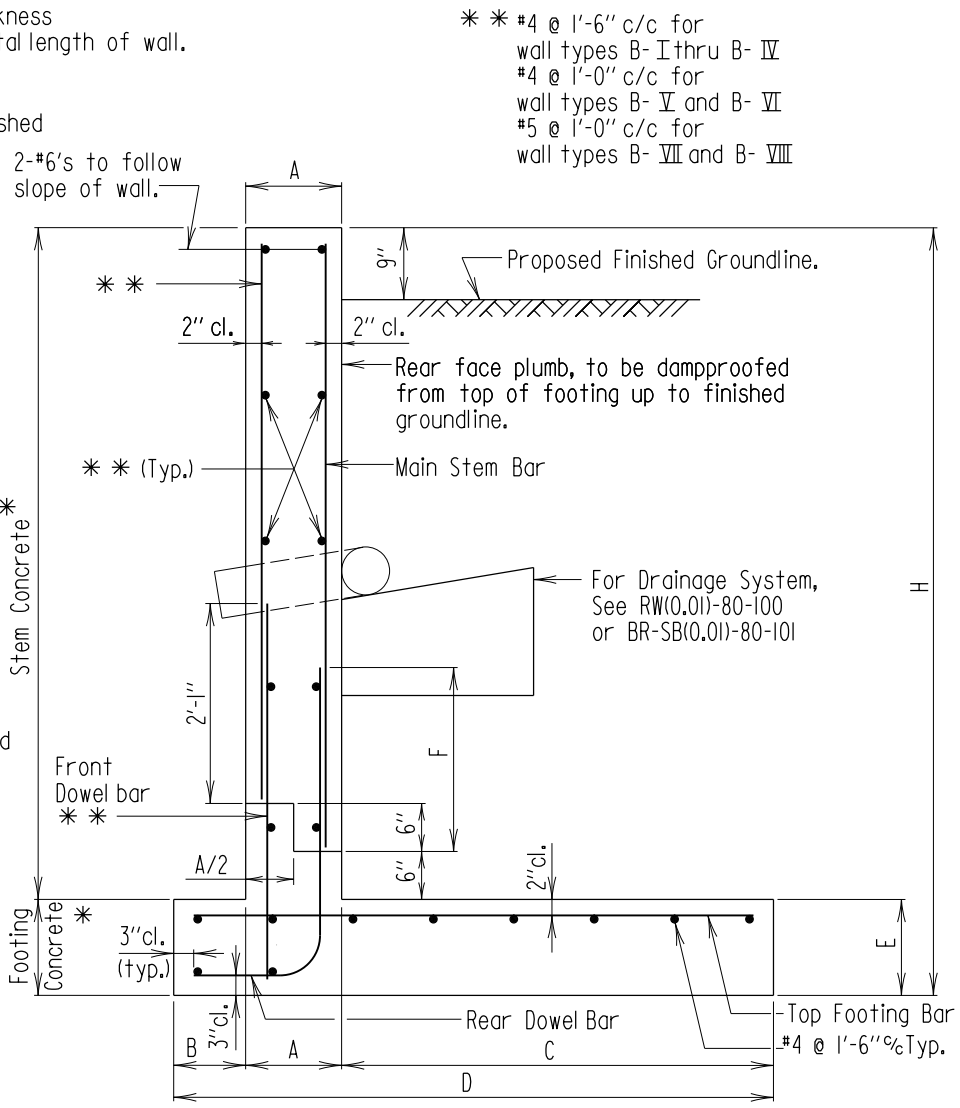
RETAINING WALLS



DETAIL A

Scale: None

(See note 2 below)



TYPICAL SECTION

Scale: 1/2'' = 1'-0''

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

Wall Type	H	A	B	C	D	E	F	Rear Dowel Bar	Main Stem Bar	Top Foot. Bar
B-I	6'-0''	1'-0''	9''	2'-6''	4'-3''	1'-0''	2'-2''	#5 @ 1'-0''c/c	#5 @ 1'-0''c/c	#5 @ 1'-0''c/c
B-II	8'-0''	1'-0''	9''	3'-6''	5'-3''	1'-0''	2'-2''	#5 @ 1'-0''c/c	#5 @ 1'-0''c/c	#5 @ 1'-0''c/c
B-III	10'-0''	1'-0''	1'-0''	4'-6''	6'-6''	1'-3''	2'-7''	#6 @ 6''c/c	#6 @ 1'-0''c/c	#6 @ 6''c/c
B-IV	12'-0''	1'-0''	1'-0''	5'-6''	7'-6''	1'-3''	2'-7''	#6 @ 6''c/c	#6 @ 1'-0''c/c	#6 @ 6''c/c
B-V	14'-0''	1'-3''	1'-3''	6'-0''	8'-6''	1'-6''	3'-6''	#7 @ 6''c/c	#7 @ 1'-0''c/c	#7 @ 6''c/c
B-VI	16'-0''	1'-6''	1'-6''	6'-9''	9'-9''	1'-6''	3'-6''	#7 @ 6''c/c	#7 @ 1'-0''c/c	#7 @ 6''c/c
B-VII	18'-0''	1'-9''	1'-9''	7'-3''	10'-9''	1'-9''	3'-6''	#7 @ 6''c/c	#7 @ 1'-0''c/c	#7 @ 6''c/c
B-VIII	20'-0''	2'-3''	2'-3''	8'-6''	13'-0''	1'-9''	4'-7''	#8 @ 6''c/c	#8 @ 1'-0''c/c	#8 @ 6''c/c

Notes:

1. A "Good Soil Condition" is that foundation material that can support a safe bearing pressure of 4 ksf and has an angle of friction of 30°.
2. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
3. Contractor has option of lapping main stem reinforcement with rear dowel reinforcement as shown; or by extending the rear dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
4. These walls are valid if traffic is present on the level area adjacent to the wall.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 6/8/83

REVISIONS	
SHA	FHWA
8-10-04	·
5-8-08	·
1-18-12	·
12-4-13	·

FHWA APPROVAL
DATE: 6-21-02

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

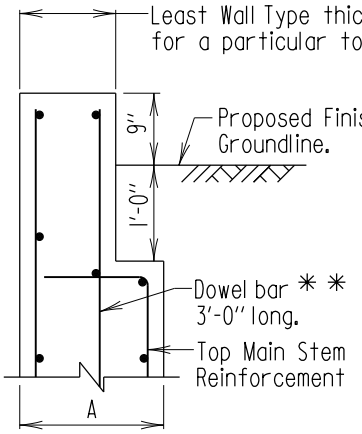
VERIFIED 5-8-2008 LRFD

TYPE B RETAINING WALL SECTION (FOR GOOD SOIL CONDITION AND TWO FOOT SURCHARGE)

STANDARD NO. RW(6.04)-83-135

SHEET 1 OF 1

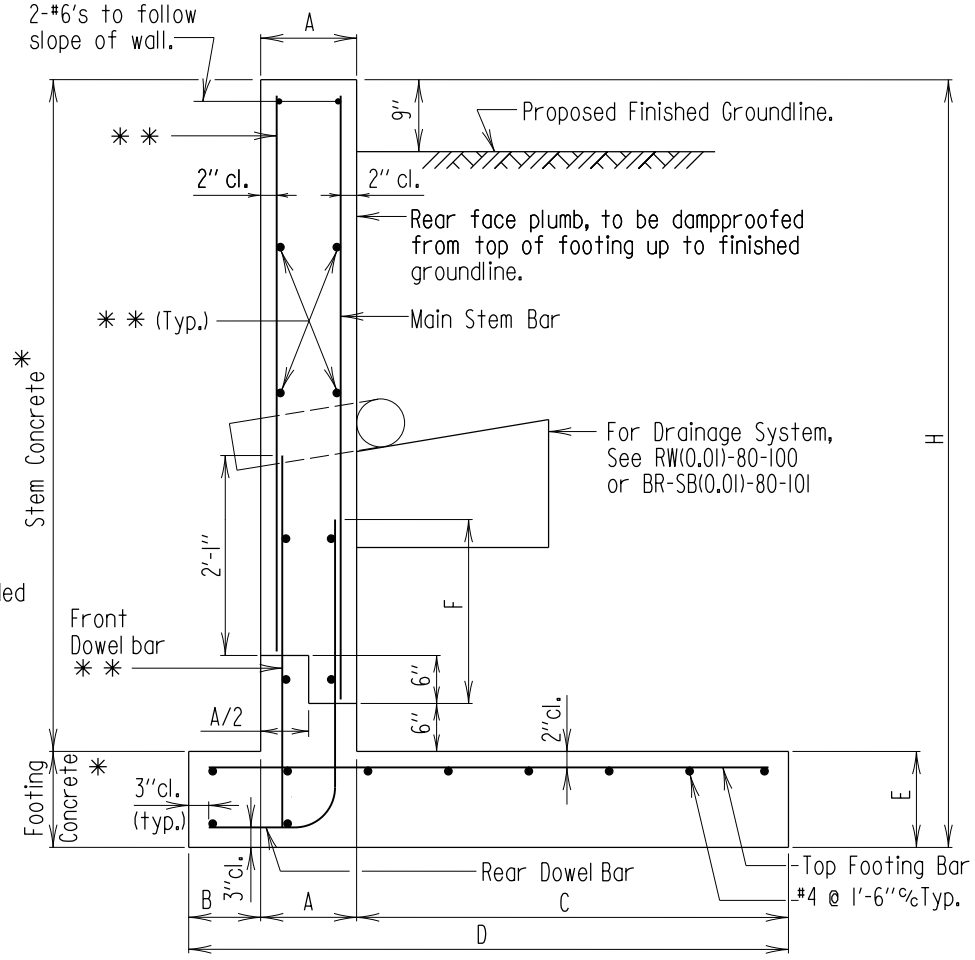
RETAINING WALLS



DETAIL A

Scale: None

(See note 2 below)



TYPICAL SECTION

Scale: 1/2" = 1'-0"

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

Wall Type	H	A	B	C	D	E	F	Rear Dowel Bar	Main Stem Bar	Top Foot. Bar
C-I	6'-0"	1'-0"	9"	2'-6"	4'-3"	1'-0"	2'-2"	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c
C-II	8'-0"	1'-0"	9"	3'-6"	5'-3"	1'-0"	2'-2"	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c
C-III	10'-0"	1'-0"	1'-0"	4'-6"	6'-6"	1'-3"	2'-7"	#6 @ 6"c/c	#6 @ 1'-0"c/c	#6 @ 6"c/c
C-IV	12'-0"	1'-0"	1'-0"	5'-6"	7'-6"	1'-3"	2'-7"	#6 @ 6"c/c	#6 @ 1'-0"c/c	#6 @ 6"c/c
C-V	14'-0"	1'-3"	1'-6"	6'-0"	8'-9"	1'-6"	3'-6"	#7 @ 6"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
C-VI	16'-0"	1'-6"	2'-3"	6'-9"	10'-6"	1'-6"	3'-6"	#7 @ 6"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
C-VII	18'-0"	2'-3"	3'-0"	7'-3"	12'-6"	1'-9"	3'-6"	#7 @ 6"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
C-VIII	20'-0"	2'-3"	4'-0"	8'-9"	15'-0"	1'-9"	4'-7"	#8 @ 6"c/c	#8 @ 1'-0"c/c	#8 @ 6"c/c

Notes:

1. A "Poor Soil Condition" is that foundation material that can support a safe bearing pressure of 3 ksf and has an angle of friction of 30°.
2. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
3. Contractor has option of lapping main stem reinforcement with rear dowel reinforcement as shown; or by extending the rear dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
4. These walls are valid if traffic is present on the level area adjacent to the wall.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 6/8/83

REVISIONS	
SHA	FHWA
8-10-04	·
10-9-07	·
1-18-12	·
12-4-13	·

FHWA APPROVAL
DATE: 6-8-90

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

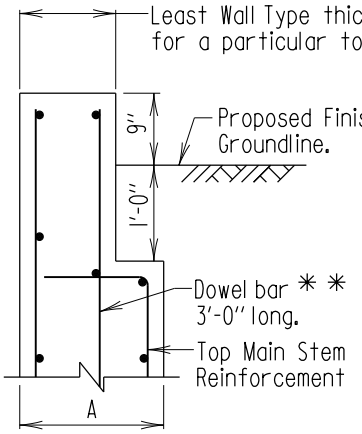
VERIFIED 10-9-2007 LRFD

TYPE C RETAINING WALL SECTION (FOR POOR SOIL CONDITION AND TWO FOOT SURCHARGE)

STANDARD NO. RW(6.05)-83-136(L)

SHEET 1 OF 1

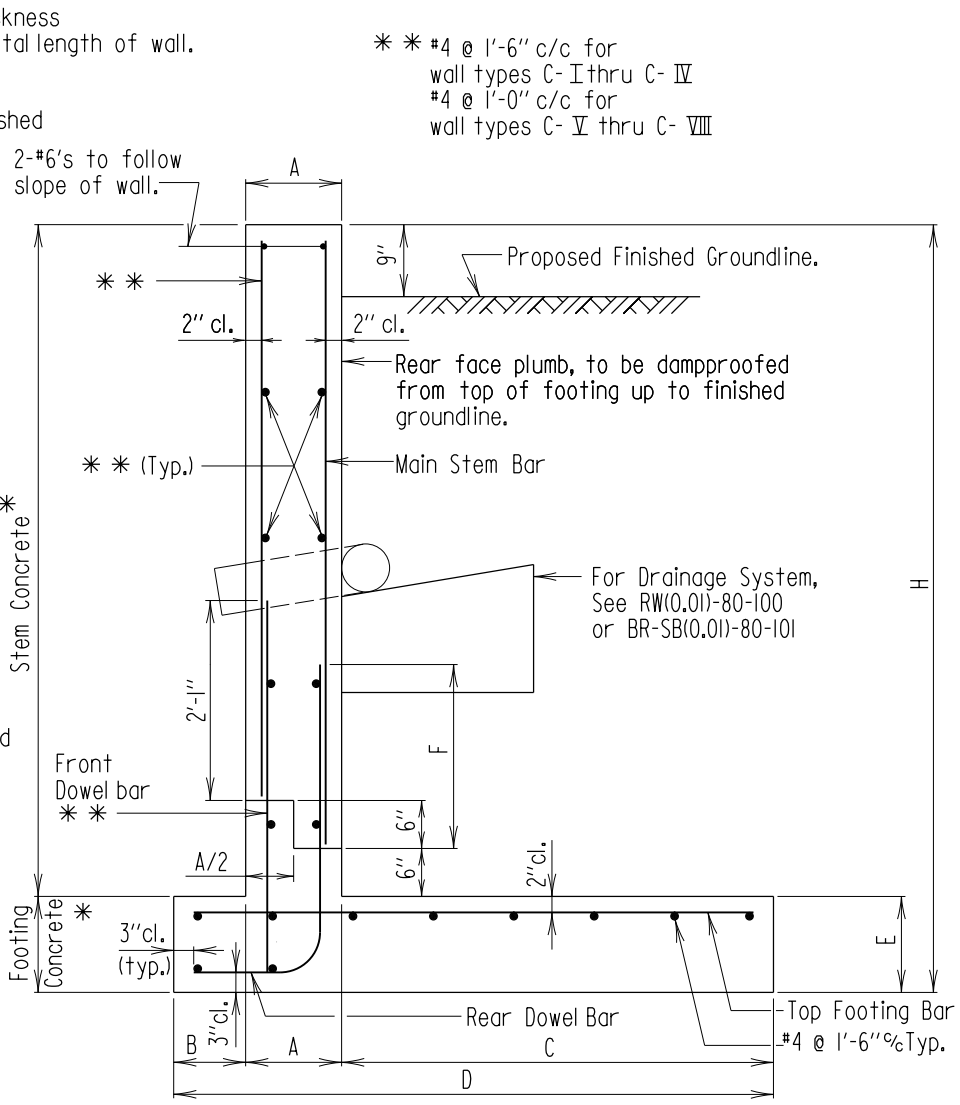
RETAINING WALLS



DETAIL A

Scale: None

(See note 2 below)



TYPICAL SECTION

Scale: 1/2" = 1'-0"

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

Wall Type	H	A	B	C	D	E	F	Rear Dowel Bar	Main Stem Bar	Top Foot. Bar
C-I	6'-0"	1'-0"	9"	2'-6"	4'-3"	1'-0"	2'-2"	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c
C-II	8'-0"	1'-0"	9"	3'-6"	5'-3"	1'-0"	2'-2"	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c
C-III	10'-0"	1'-0"	1'-0"	4'-6"	6'-6"	1'-3"	2'-7"	#6 @ 6"c/c	#6 @ 1'-0"c/c	#6 @ 1'-0"c/c
C-IV	12'-0"	1'-0"	1'-0"	5'-6"	7'-6"	1'-3"	2'-7"	#6 @ 6"c/c	#6 @ 1'-0"c/c	#6 @ 6"c/c
C-V	14'-0"	1'-3"	1'-3"	6'-0"	8'-6"	1'-6"	3'-6"	#7 @ 6"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
C-VI	16'-0"	1'-6"	2'-0"	6'-9"	10'-3"	1'-6"	3'-6"	#7 @ 6"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
C-VII	18'-0"	2'-3"	2'-6"	7'-3"	12'-0"	1'-9"	3'-6"	#7 @ 6"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
C-VIII	20'-0"	2'-3"	3'-3"	8'-9"	14'-3"	1'-9"	4'-7"	#8 @ 6"c/c	#8 @ 1'-0"c/c	#8 @ 6"c/c

Notes:

1. A "Poor Soil Condition" is that foundation material that can support a safe bearing pressure of 3 ksf and has an angle of friction of 30°.
2. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
3. Contractor has option of lapping main stem reinforcement with rear dowel reinforcement as shown; or by extending the rear dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
4. These walls are valid if traffic is present on the level area adjacent to the wall.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 6/8/83

REVISIONS	
SHA	FHWA
7-15-94	·
9-14-94	·
7-16-02	·
8-10-04	·

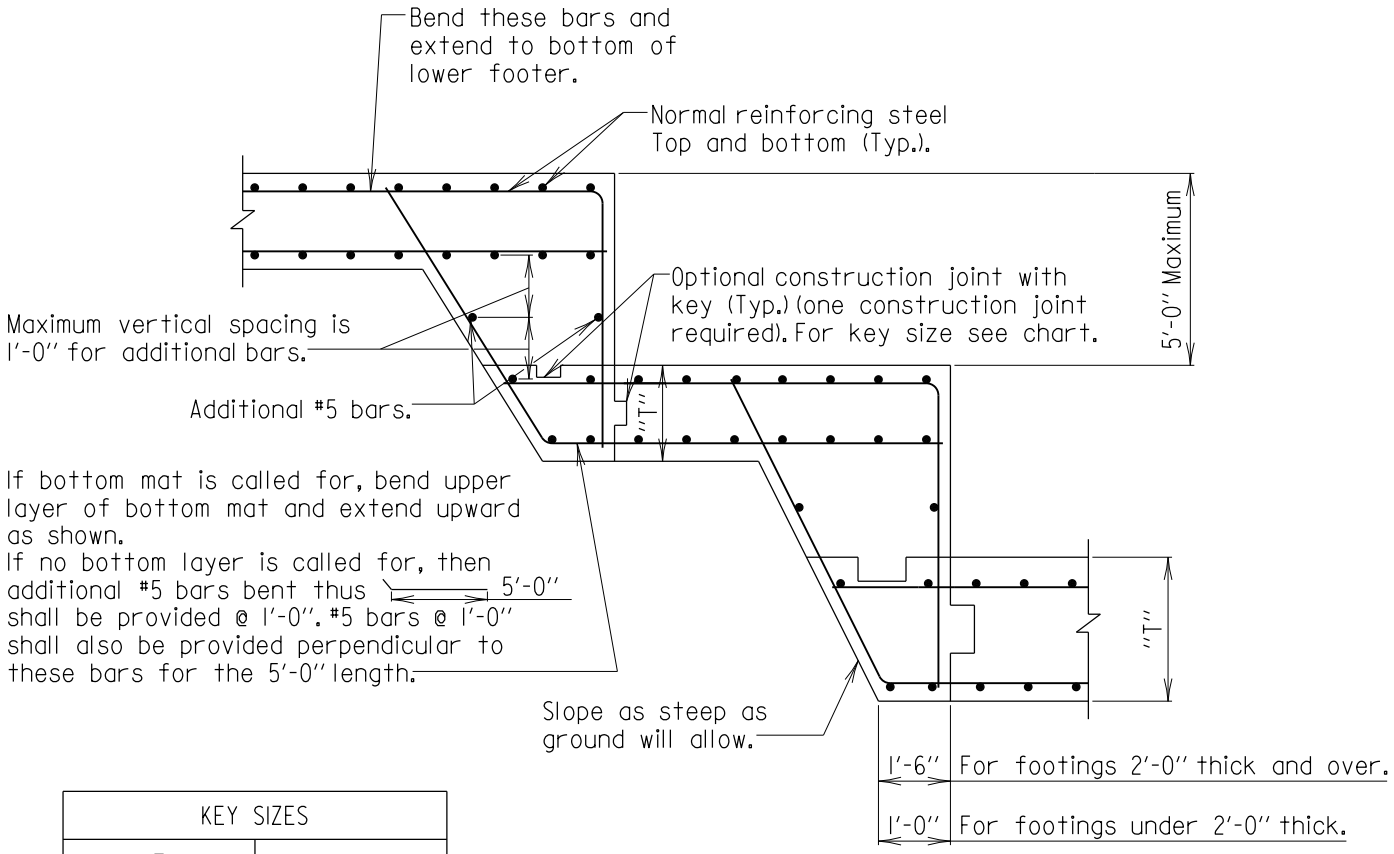
FHWA APPROVAL
DATE: 6-8-90

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

TYPE C RETAINING WALL SECTION (FOR POOR SOIL CONDITION AND TWO FOOT SURCHARGE)

STANDARD NO. RW(6.05)-83-136 SHEET 1 OF 1

RETAINING WALLS



KEY SIZES	
T	Key
1'-0" to 1'-5"	2" x 4"
1'-6" to 1'-11"	3" x 6"
2'-0" to 2'-5"	4" x 8"
2'-6" to 3'-0"	5" x 10"

TYPICAL SECTION

Scale: 3/8"=1'-0"

Notes:

1. All keys are nominal size.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 11/4/83

REVISIONS	
SHA	FHWA
7-18-94	·
9-24-96	·
7-16-02	·
8-28-02	·

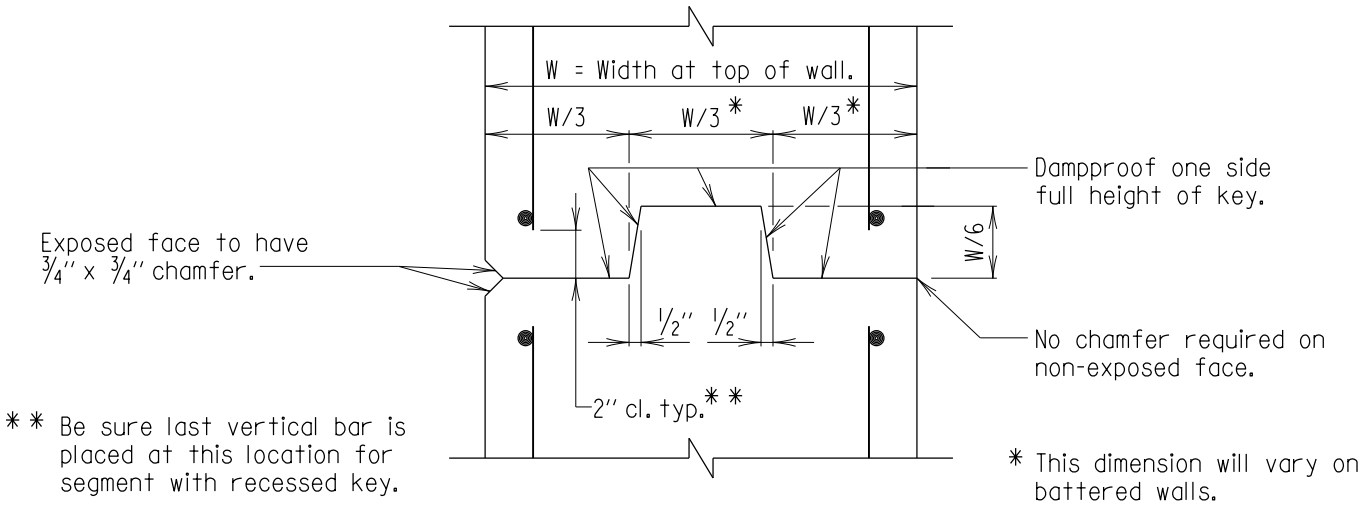
FHWA APPROVAL
DATE: 12-9-83

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

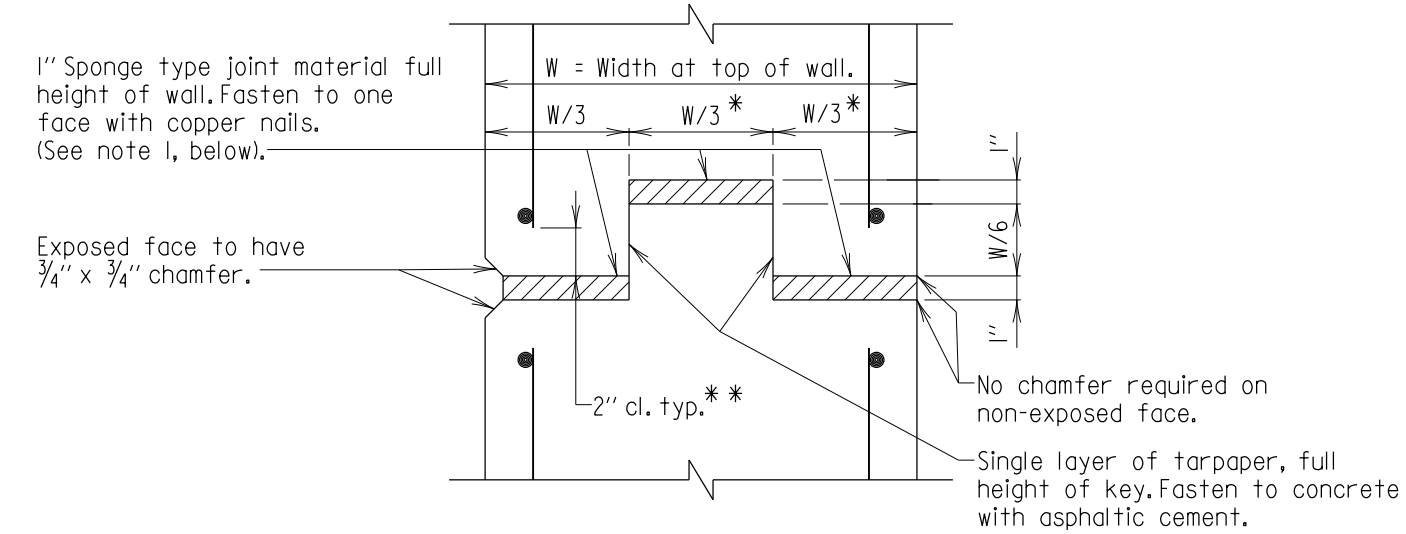
STEPPED FOOTING DETAIL

STANDARD NO. RW(6.12)-83-155 SHEET 1 OF 1

RETAINING WALLS



SECTION
STEM CONTRACTION JOINT
Scale: 1 1/2" = 1'-0"



SECTION
STEM EXPANSION JOINT
Scale: 1 1/2" = 1'-0"

Notes:
1. Joint locations shall be as shown on contract drawing. If no locations are given concrete retaining walls shall have contraction joints a maximum of every 30'-0"; and expansion joints, with 1" sponge type material (see 911.02), a maximum of every 90'-0"
2. Stop key 9" below top of wall.
3. Reinforcing steel shall not pass through contraction or expansion joint.
4. For battered walls, with stems greater than 12 feet height, key dimensions noted thus *, shall be based on wall thickness at mid height.
5. All keys are nominal size.
6. Only place contraction and expansion joints in stems (no joint in footer).

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 4/19/84

REVISIONS	
SHA	FHWA
1-4-94	·
7-16-02	·
3-22-06	·
5-4-06	·

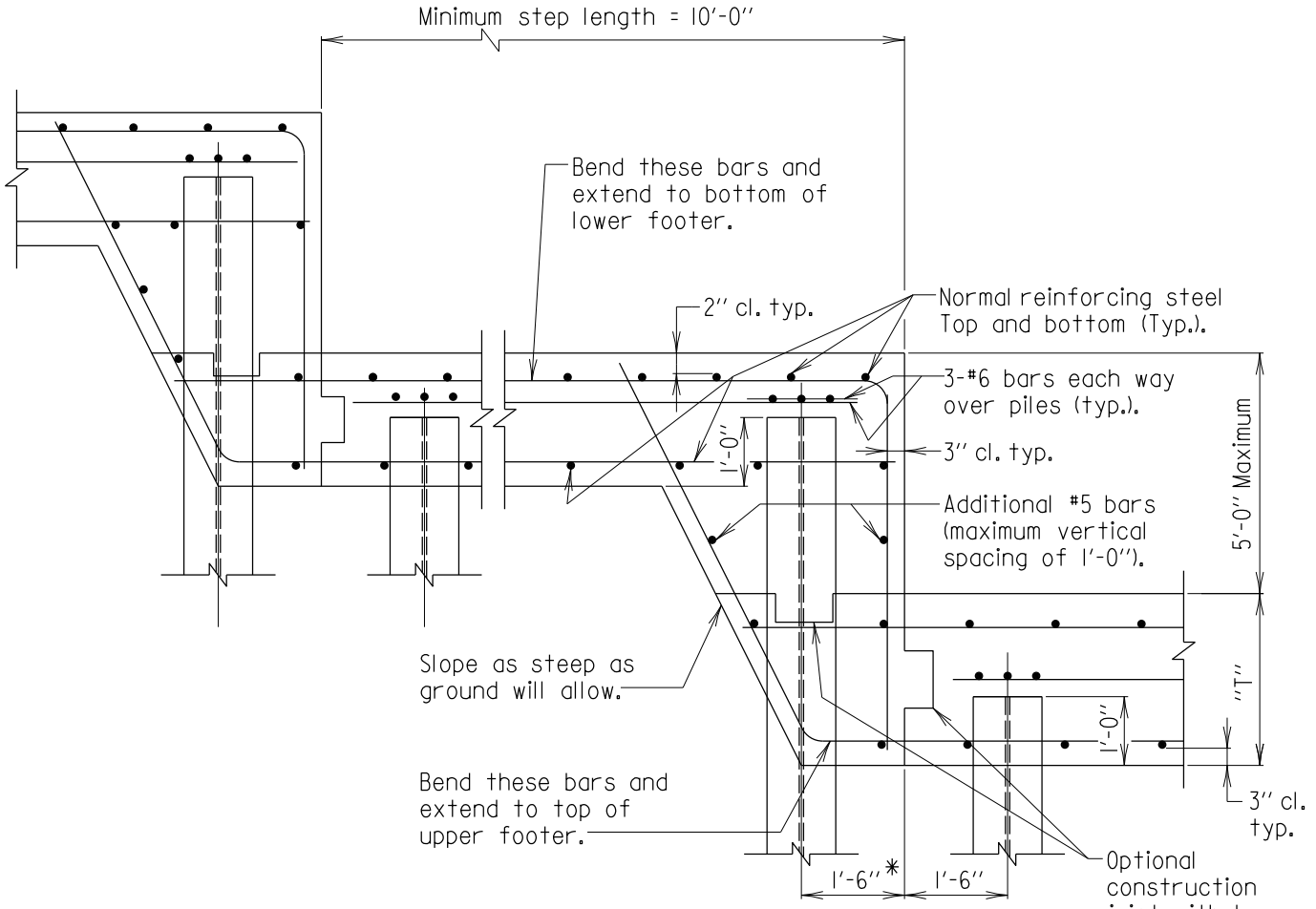
FHWA APPROVAL
DATE: 5-3-84

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

CONCRETE RETAINING WALL CONTRACTION AND EXPANSION JOINTS

STANDARD NO. RW(6.13)-83-157 SHEET 1 OF 1

RETAINING WALLS



* To center line of pile and to end of lower footer.

KEY SIZES	
T	Key
2'-0" to 2'-5"	4" x 8"
2'-6" to 3'-0"	5" x 10"

TYPICAL SECTION

Scale: 3/8" = 1'-0"

Notes:
1. Steel H piles shown. Other pile types similar.
2. See Plan of Footing for orientation of piles.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 5/16/89

REVISIONS	
SHA	FHWA
7-2-93	·
7-18-94	·
9-24-96	·
7-16-02	·

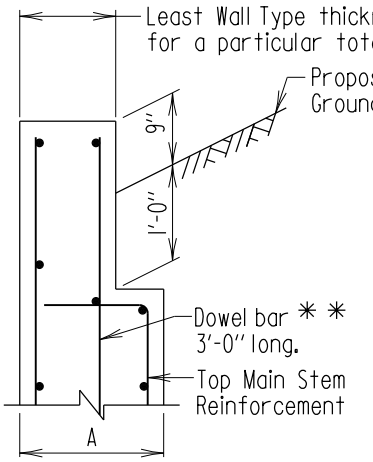
FHWA APPROVAL
DATE: 6-8-90

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

STEPPED FOOTING DETAIL WITH PILES

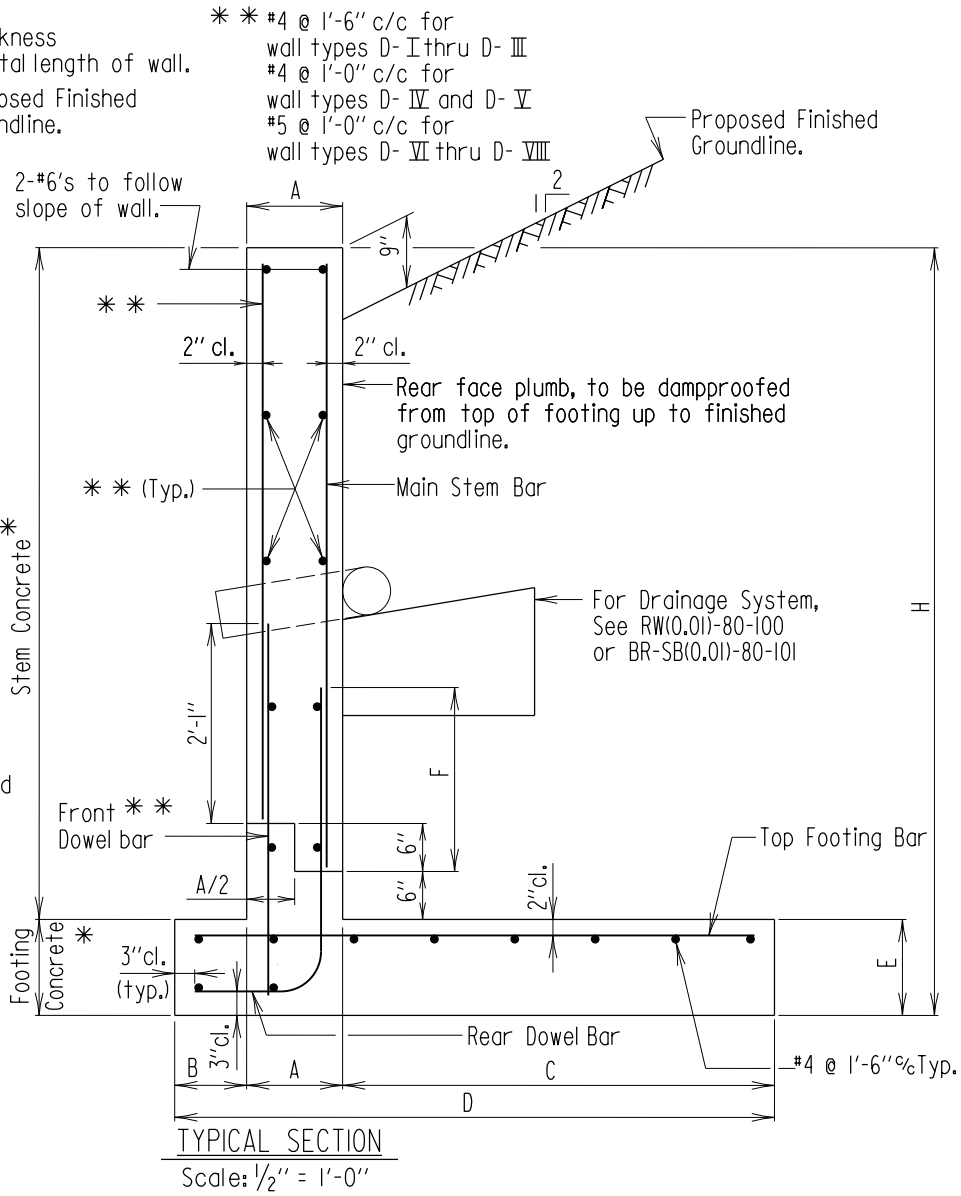
STANDARD NO. RW(6.14)-89-201 SHEET 1 OF 1

RETAINING WALLS



DETAIL A

Scale: None
(See note 2 below)



TYPICAL SECTION

Scale: 1/2" = 1'-0"

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

Wall Type	H	A	B	C	D	E	F	Rear Dowel Bar	Main Stem Bar	Top Foot. Bar
D-I	6'-0"	1'-0"	1'-3"	2'-6"	4'-9"	1'-0"	2'-2"	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c
D-II	8'-0"	1'-0"	1'-6"	4'-3"	6'-9"	1'-3"	2'-2"	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c
D-III	10'-0"	1'-0"	1'-6"	6'-0"	8'-6"	1'-6"	2'-7"	#6 @ 1'-0"c/c	#6 @ 1'-0"c/c	#6 @ 6"c/c
D-IV	12'-0"	1'-6"	1'-6"	7'-0"	10'-0"	1'-6"	2'-7"	#6 @ 1'-0"c/c	#6 @ 1'-0"c/c	#6 @ 6"c/c
D-V	14'-0"	1'-9"	1'-9"	8'-3"	11'-9"	1'-6"	3'-6"	#7 @ 1'-0"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
D-VI	16'-0"	1'-9"	1'-9"	10'-0"	13'-6"	1'-9"	4'-7"	#8 @ 6"c/c	#8 @ 1'-0"c/c	#8 @ 6"c/c
D-VII	18'-0"	2'-0"	2'-3"	11'-0"	15'-3"	2'-0"	5'-9"	#9 @ 6"c/c	#9 @ 1'-0"c/c	#9 @ 6"c/c
D-VIII	20'-0"	2'-6"	2'-6"	12'-6"	17'-3"	2'-6"	5'-9"	#9 @ 6"c/c	#9 @ 1'-0"c/c	#9 @ 6"c/c

Notes:

1. An "Excellent Soil Condition" is that foundation material that can support a safe bearing pressure of 5 ksf and has an angle of friction of 33°.
2. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
3. Contractor has option of lapping main stem reinforcement with rear dowel reinforcement as shown; or by extending the rear dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
4. These walls are valid if the sloping backfill levels off and traffic is present on the level area.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 7/16/02

REVISIONS	
SHA	FHWA
10-9-07	·
1-18-12	·
12-4-13	·
·	·

FHWA APPROVAL
DATE: .

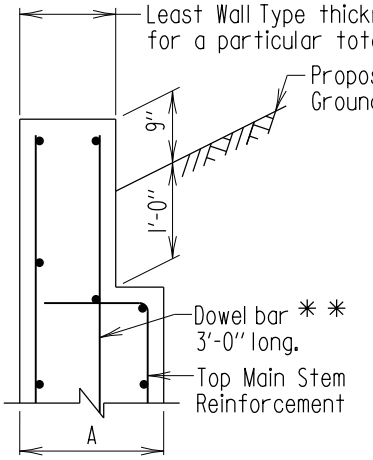
STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

VERIFIED 10-9-2007 LRFD

TYPE D RETAINING WALL SECTION (FOR EXCELLENT SOIL CONDITION AND SLOPING GROUNDLINE)

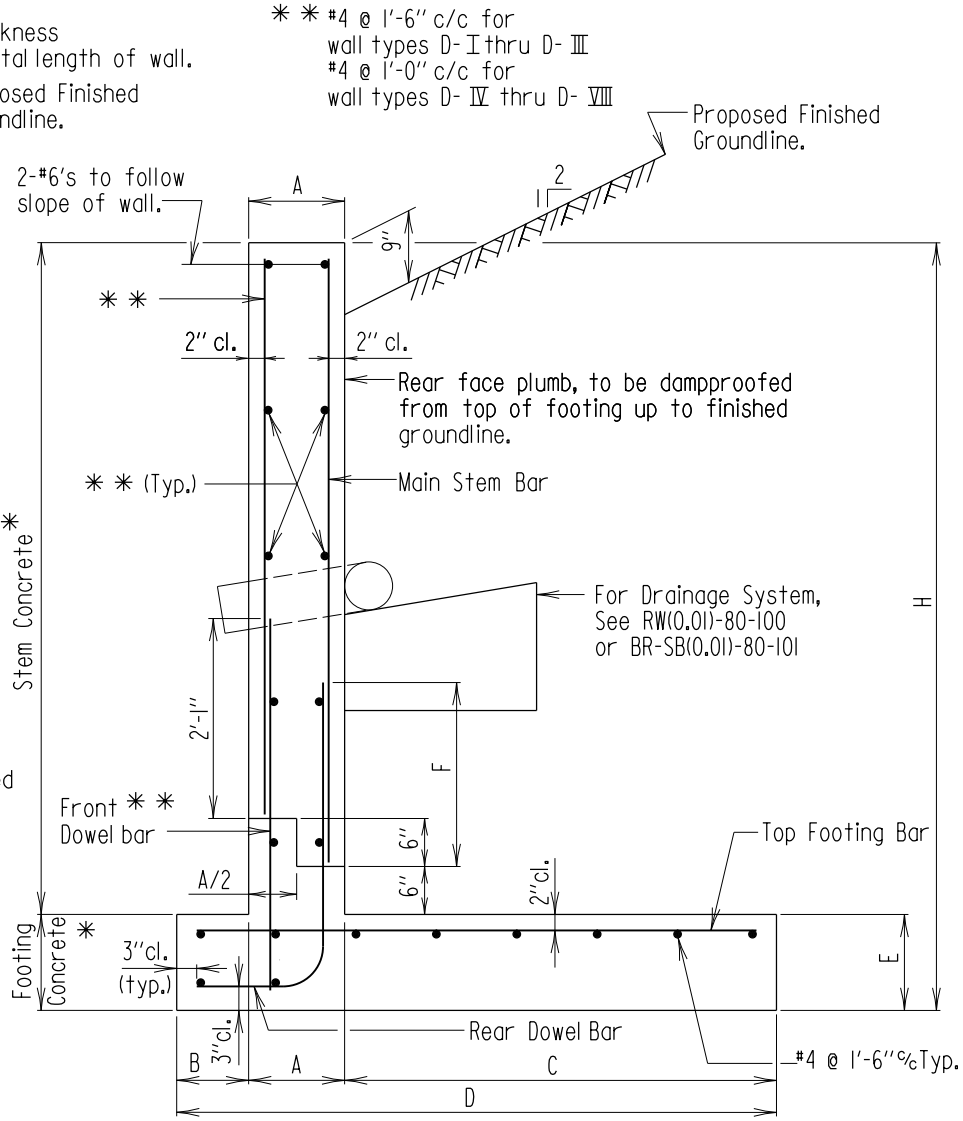
STANDARD NO. RW(6.06)-02-340(L) SHEET 1 OF 1

RETAINING WALLS



DETAIL A

Scale: None
(See note 2 below)



TYPICAL SECTION

Scale: 1/2" = 1'-0"

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

Wall Type	H	A	B	C	D	E	F	Rear Dowel Bar	Main Stem Bar	Top Foot. Bar
D-I	6'-0"	1'-0"	1'-3"	2'-6"	4'-9"	1'-0"	2'-2"	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c
D-II	8'-0"	1'-0"	1'-6"	3'-6"	6'-0"	1'-3"	2'-2"	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c	#5 @ 1'-0"c/c
D-III	10'-0"	1'-0"	1'-6"	5'-3"	7'-9"	1'-6"	2'-7"	#6 @ 1'-0"c/c	#6 @ 1'-0"c/c	#6 @ 6"c/c
D-IV	12'-0"	1'-6"	1'-6"	6'-0"	9'-0"	1'-6"	2'-7"	#6 @ 1'-0"c/c	#6 @ 1'-0"c/c	#6 @ 6"c/c
D-V	14'-0"	1'-9"	1'-9"	7'-3"	10'-9"	1'-6"	3'-6"	#7 @ 1'-0"c/c	#7 @ 1'-0"c/c	#7 @ 6"c/c
D-VI	16'-0"	1'-9"	1'-9"	9'-0"	12'-6"	1'-9"	4'-7"	#8 @ 6"c/c	#8 @ 1'-0"c/c	#8 @ 6"c/c
D-VII	18'-0"	2'-0"	2'-3"	10'-0"	14'-3"	2'-0"	5'-9"	#9 @ 6"c/c	#9 @ 1'-0"c/c	#9 @ 6"c/c
D-VIII	20'-0"	2'-3"	2'-6"	11'-0"	15'-9"	2'-6"	5'-9"	#9 @ 6"c/c	#9 @ 1'-0"c/c	#9 @ 6"c/c

Notes:

1. An "Excellent Soil Condition" is that foundation material that can support a safe bearing pressure of 5 ksf and has an angle of friction of 33°.
2. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
3. Contractor has option of lapping main stem reinforcement with rear dowel reinforcement as shown; or by extending the rear dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
4. These walls are valid if the sloping backfill levels off and traffic is present on the level area.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 7/16/02

REVISIONS	
SHA	FHWA
8-10-04	.
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.	.
.	.

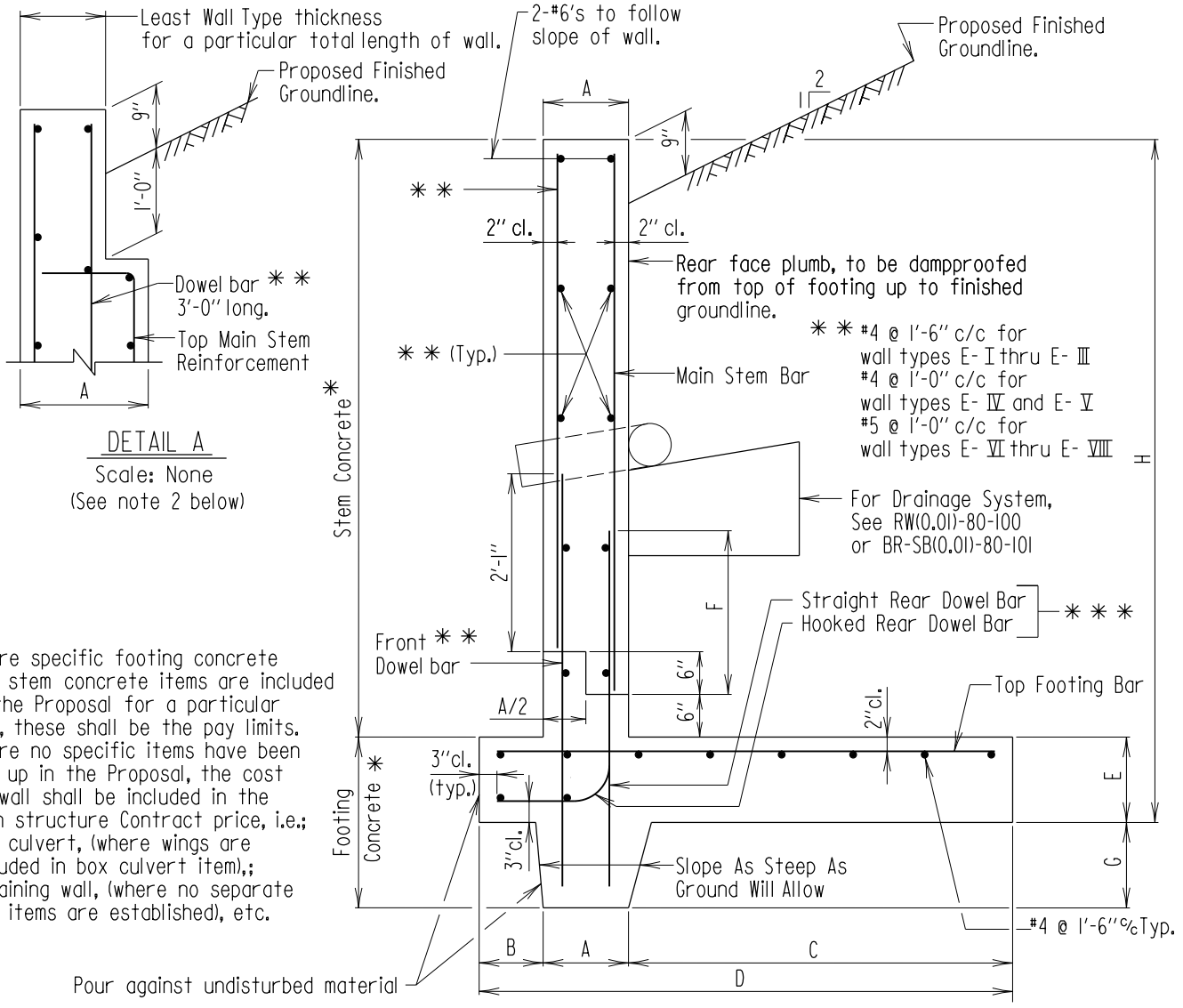
FHWA APPROVAL
DATE: .

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

TYPE D RETAINING WALL SECTION (FOR EXCELLENT SOIL CONDITION AND SLOPING GROUNDLINE)

STANDARD NO. RW(6.06)-02-340 SHEET 1 OF 1

RETAINING WALLS



DETAIL A

Scale: None

(See note 2 below)

TYPICAL SECTION

Scale: 1/2'' = 1'-0''

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

* * * Alternate Hooked Bars with Straight Bars

Wall Type	H	A	B	C	D	E	F	G	Straight Rear Dowel Bar	Hooked Rear Dowel Bar	Main Stem Bar	Top Foot. Bar
E-I	6'-0''	1'-0''	1'-9''	4'-6''	7'-3''	1'-0''	2'-2''	1'-0''	#5 @ 2'-0''c/c	#5 @ 2'-0''c/c	#5 @ 1'-0''c/c	#5 @ 6''c/c
E-II	8'-0''	1'-0''	1'-9''	4'-9''	7'-6''	1'-0''	2'-2''	1'-0''	#5 @ 2'-0''c/c	#5 @ 2'-0''c/c	#5 @ 1'-0''c/c	#5 @ 6''c/c
E-III	10'-0''	1'-0''	1'-9''	5'-6''	8'-3''	1'-0''	2'-7''	2'-0''	#6 @ 1'-0''c/c	#6 @ 1'-0''c/c	#6 @ 1'-0''c/c	#6 @ 6''c/c
E-IV	12'-0''	1'-3''	2'-0''	7'-3''	10'-6''	1'-6''	3'-6''	2'-0''	#7 @ 1'-0''c/c	#7 @ 1'-0''c/c	#7 @ 1'-0''c/c	#7 @ 6''c/c
E-V	14'-0''	1'-6''	2'-6''	7'-6''	11'-6''	1'-9''	3'-6''	3'-0''	#7 @ 1'-0''c/c	#7 @ 1'-0''c/c	#7 @ 1'-0''c/c	#7 @ 6''c/c
E-VI	16'-0''	1'-9''	3'-0''	8'-6''	13'-3''	2'-0''	4'-7''	3'-0''	#8 @ 1'-0''c/c	#8 @ 1'-0''c/c	#8 @ 1'-0''c/c	#8 @ 6''c/c
E-VII	18'-0''	2'-3''	3'-6''	10'-3''	16'-0''	2'-3''	5'-9''	3'-0''	#9 @ 1'-0''c/c	#9 @ 1'-0''c/c	#9 @ 1'-0''c/c	#9 @ 6''c/c
E-VIII	20'-0''	2'-9''	4'-3''	12'-0''	19'-0''	2'-6''	5'-9''	3'-0''	#9 @ 1'-0''c/c	#9 @ 1'-0''c/c	#9 @ 1'-0''c/c	#9 @ 6''c/c

Notes:

1. A "Good Soil Condition" is that foundation material that can support a safe bearing pressure of 4 ksf and has an angle of friction of 30°.
2. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
3. Contractor has option of lapping main stem reinforcement with rear dowel reinforcement as shown; or by extending the rear dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
4. These walls are valid if the sloping backfill levels off and traffic is present on the level area.

APPROVAL
E.S. Freedman DIRECTOR OFFICE OF STRUCTURES
DATE: 7/16/02

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STATE OF MARYLAND
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STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

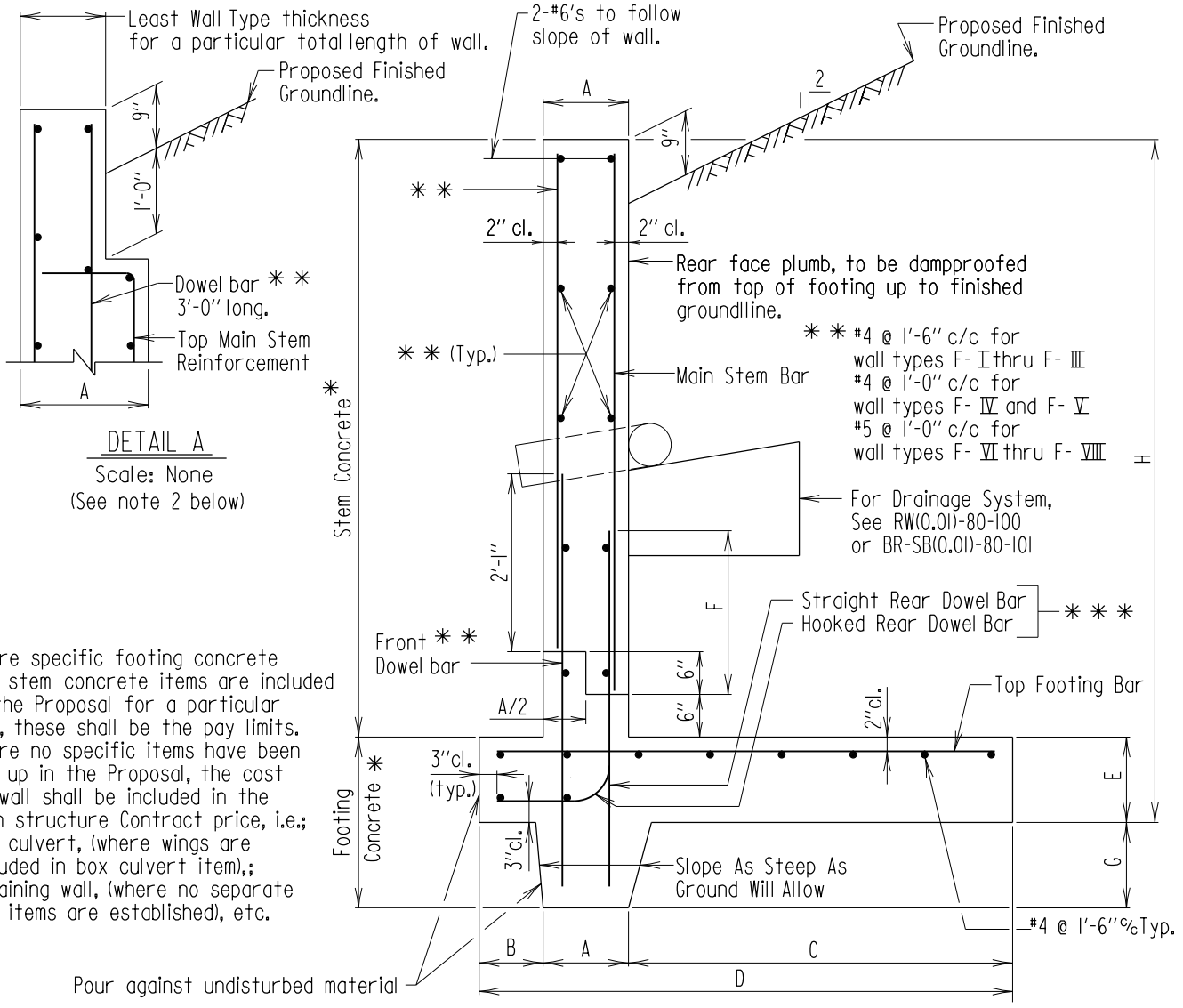
VERIFIED 5-8-2008 LRFD

TYPE E RETAINING WALL SECTION (FOR GOOD SOIL CONDITION AND SLOPING GROUNDLINE)

STANDARD NO. RW(6.07)-02-341

SHEET 1 OF 1

RETAINING WALLS



* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

Wall Type	H	A	B	C	D	E	F	G	Straight Rear Dowel Bar	Hooked Rear Dowel Bar	Main Stem Bar	Top Foot. Bar
F-I	6'-0''	1'-0''	1'-9''	4'-6''	7'-3''	1'-0''	2'-2''	1'-0''	#5 @ 2'-0''c/c	#5 @ 2'-0''c/c	#5 @ 1'-0''c/c	#5 @ 6''c/c
F-II	8'-0''	1'-0''	1'-9''	4'-9''	7'-6''	1'-0''	2'-2''	1'-0''	#5 @ 2'-0''c/c	#5 @ 2'-0''c/c	#5 @ 1'-0''c/c	#5 @ 6''c/c
F-III	10'-0''	1'-0''	1'-9''	5'-6''	8'-3''	1'-0''	2'-7''	2'-0''	#6 @ 1'-0''c/c	#6 @ 1'-0''c/c	#6 @ 1'-0''c/c	#6 @ 6''c/c
F-IV	12'-0''	1'-3''	2'-0''	7'-3''	10'-6''	1'-6''	3'-6''	2'-0''	#7 @ 1'-0''c/c	#7 @ 1'-0''c/c	#7 @ 1'-0''c/c	#7 @ 6''c/c
F-V	14'-0''	1'-6''	3'-0''	7'-6''	12'-0''	1'-9''	3'-6''	3'-0''	#7 @ 1'-0''c/c	#7 @ 1'-0''c/c	#7 @ 1'-0''c/c	#7 @ 6''c/c
F-VI	16'-0''	1'-9''	4'-0''	8'-6''	14'-3''	2'-0''	4'-7''	3'-0''	#8 @ 1'-0''c/c	#8 @ 1'-0''c/c	#8 @ 1'-0''c/c	#8 @ 6''c/c
F-VII	18'-0''	2'-3''	5'-0''	10'-3''	17'-6''	2'-3''	5'-9''	3'-0''	#9 @ 1'-0''c/c	#9 @ 1'-0''c/c	#9 @ 1'-0''c/c	#9 @ 6''c/c
F-VIII	20'-0''	2'-9''	6'-3''	12'-0''	21'-0''	2'-6''	5'-9''	3'-0''	#9 @ 1'-0''c/c	#9 @ 1'-0''c/c	#9 @ 1'-0''c/c	#9 @ 6''c/c

Notes:

1. A "Poor Soil Condition" is that foundation material that can support a safe bearing pressure of 3 ksf and has an angle of friction of 30°.
2. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
3. Contractor has option of lapping main stem reinforcement with rear dowel reinforcement as shown; or by extending the rear dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
4. These walls are valid if the sloping backfill levels off and traffic is present on the level area.

APPROVAL		
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STATE OF MARYLAND
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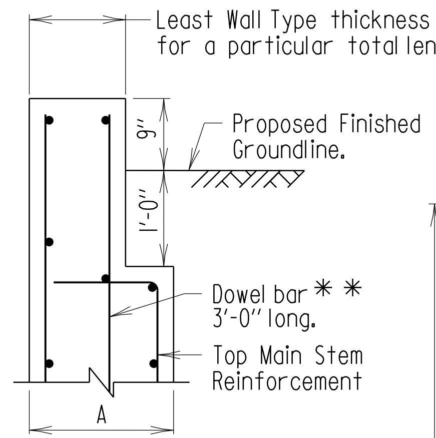
VERIFIED 5-8-2008 LRFD

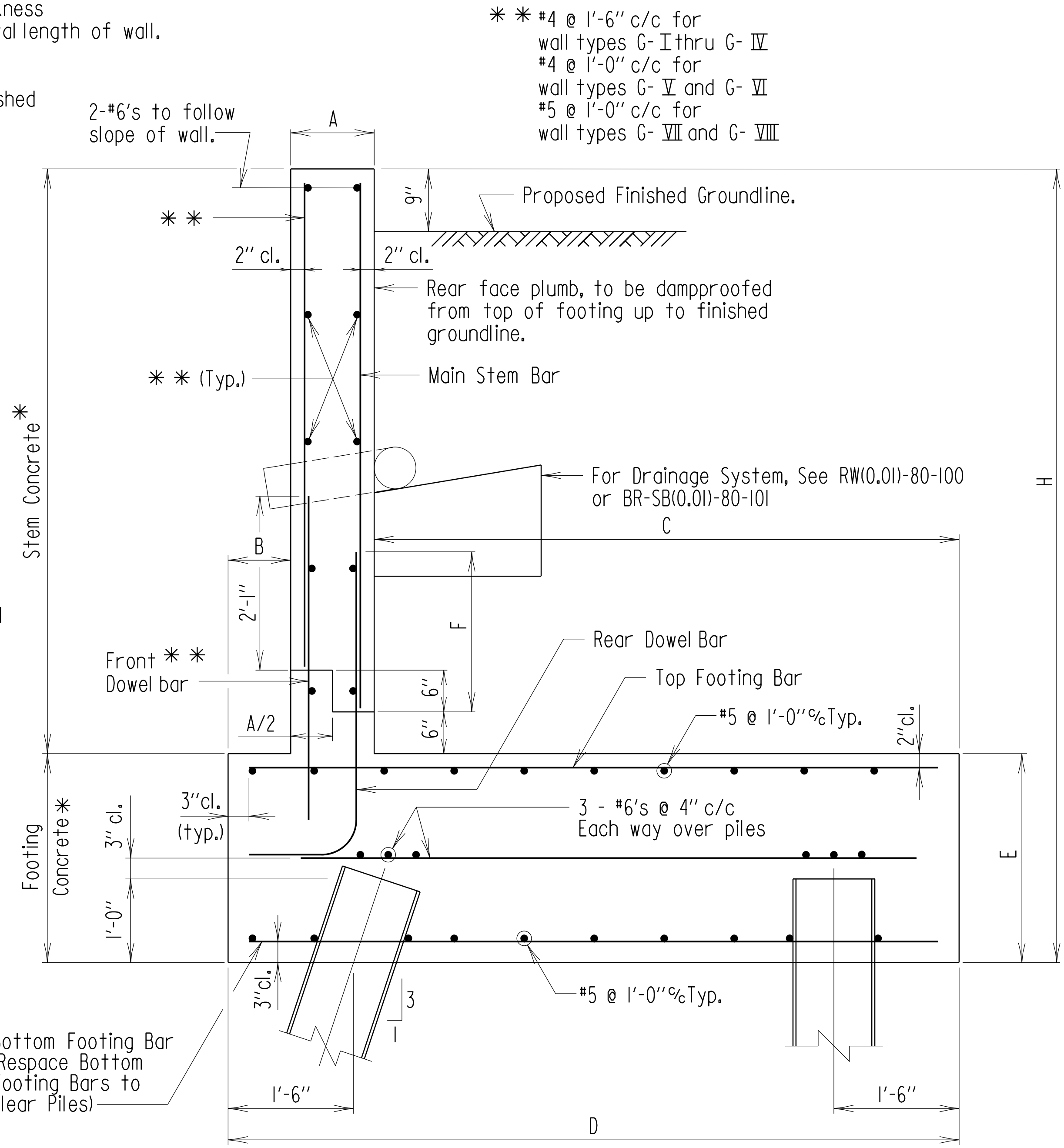
TYPE F RETAINING WALL SECTION (FOR POOR SOIL CONDITION AND SLOPING GROUNDLINE)

STANDARD NO. RW(6.08)-02-342 SHEET 1 OF 1

RETAINING WALLS



DETAIL A
Scale: None
(See note no.1 Sheet 2)



TYPICAL SECTION
Scale: 1/2" = 1'-0"

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

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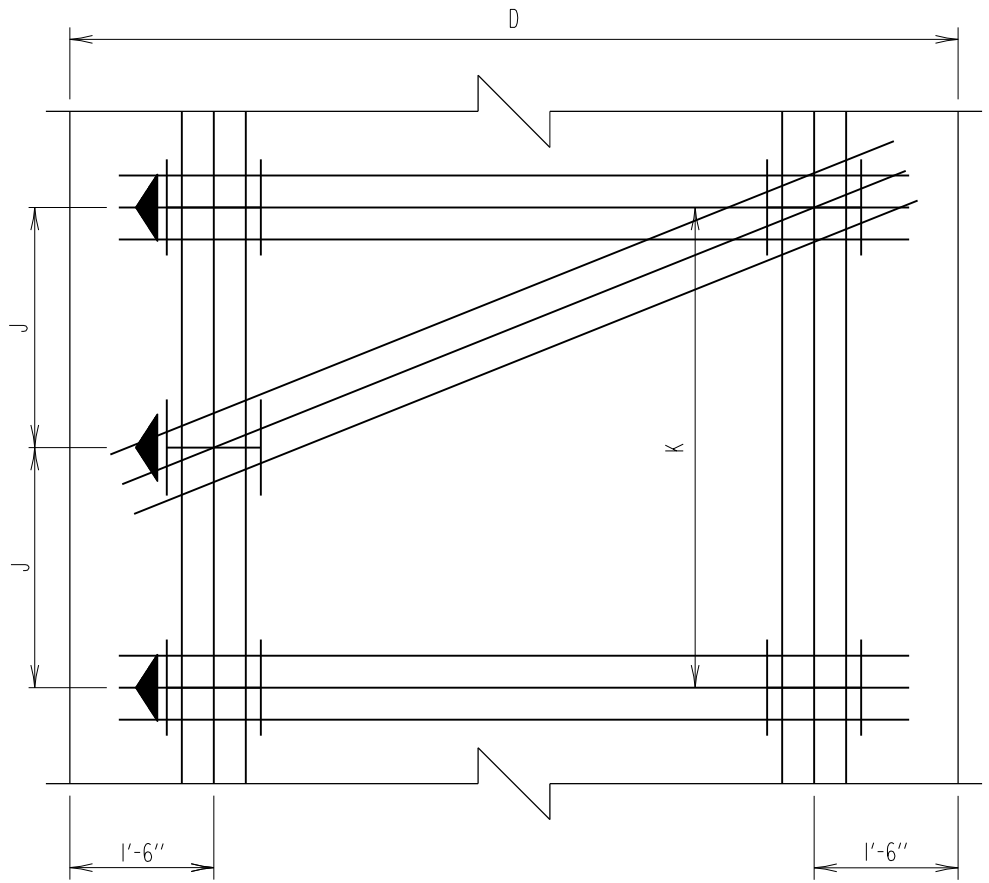
VERIFIED 11-13-2007 LRFD

TYPE G RETAINING WALL SECTION (FOR PILE FOOTING AND TWO FOOT SURCHARGE)

STANDARD NO. RW(6.09)-02-343(L) SHEET 1 OF 2

RETAINING WALLS



TYPICAL PILE PLAN
Scale: 1/2" = 1'-0"

Notes:
1. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
2. Contractor has option of lapping stem reinforcement with toe reinforcement and/or dowels as shown; or by extending the toe and/or dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
3. H piles shown for illustration purpose only. For pile type, see Pile Layout on pertinent Contract Drawing.
4. Pile spacings are maximum. For actual pile spacing, see Pile Layout on pertinent contract drawing.
5. These walls are valid if traffic is present on the level area adjacent to the wall.
6. Capacities include resistance factors (LRFD only).

Wall Type	H	A	B	C	D	E	Rear Dowel Bar	Main Stem Bar	Top Footing Bar	Bottom Footing Bar	F	PILE CAPACITY - DESIGN LOAD							
												25 TONS		40 TONS		55 TONS		70 TONS	
												J	K	J	K	J	K	J	K
G-I	6'-0"	1'-0"	0'-9"	4'-3"	6'-0"	2'-3"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	2'-2"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
G-II	8'-0"	1'-0"	0'-9"	4'-3"	6'-0"	2'-3"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	2'-2"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
G-III	10'-0"	1'-0"	0'-9"	4'-3"	6'-0"	2'-3"	#5 @ 6"	#5 @ 1'-0"	#5 @ 6"	#5 @ 1'-0"	2'-2"	4'-0"	8'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
G-IV	12'-0"	1'-0"	1'-0"	4'-3"	6'-3"	2'-3"	#7 @ 6"	#7 @ 1'-0"	#7 @ 6"	#7 @ 1'-0"	3'-0"	2'-9"	5'-6"	4'-9"	9'-6"	4'-9"	9'-6"	4'-9"	9'-6"
G-V	14'-0"	1'-3"	1'-6"	4'-3"	7'-0"	2'-3"	#7 @ 6"	#7 @ 1'-0"	#7 @ 6"	#7 @ 1'-0"	3'-0"			3'-6"	7'-0"	4'-6"	9'-0"	4'-6"	9'-0"
G-VI	16'-0"	1'-6"	1'-9"	4'-3"	7'-6"	2'-6"	#7 @ 6"	#7 @ 1'-0"	#7 @ 6"	#7 @ 1'-0"	3'-6"			2'-9"	5'-6"	3'-9"	7'-6"	4'-6"	9'-0"
G-VII	18'-0"	1'-9"	2'-3"	4'-3"	8'-3"	2'-6"	#8 @ 6"	#8 @ 1'-0"	#8 @ 6"	#8 @ 1'-0"	3'-6"					3'-0"	6'-0"	3'-9"	7'-6"
G-VIII	20'-0"	2'-0"	2'-6"	4'-3"	8'-9"	2'-9"	#8 @ 6"	#8 @ 1'-0"	#8 @ 6"	#8 @ 1'-0"	4'-7"							3'-0"	6'-0"

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FHWA APPROVAL
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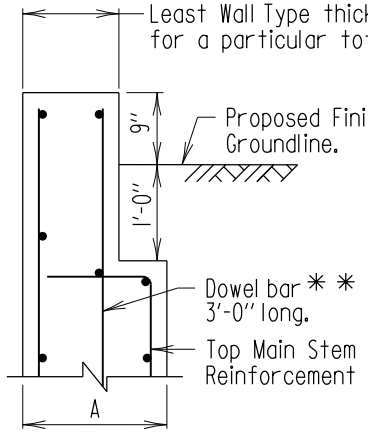
TYPE G RETAINING WALL SECTION (FOR PILE FOOTING AND TWO FOOT SURCHARGE)

STANDARD NO. RW6.09-02-343(L)

SHEET 2 OF 2

VERIFIED 11-13-2007 LRFD

RETAINING WALLS

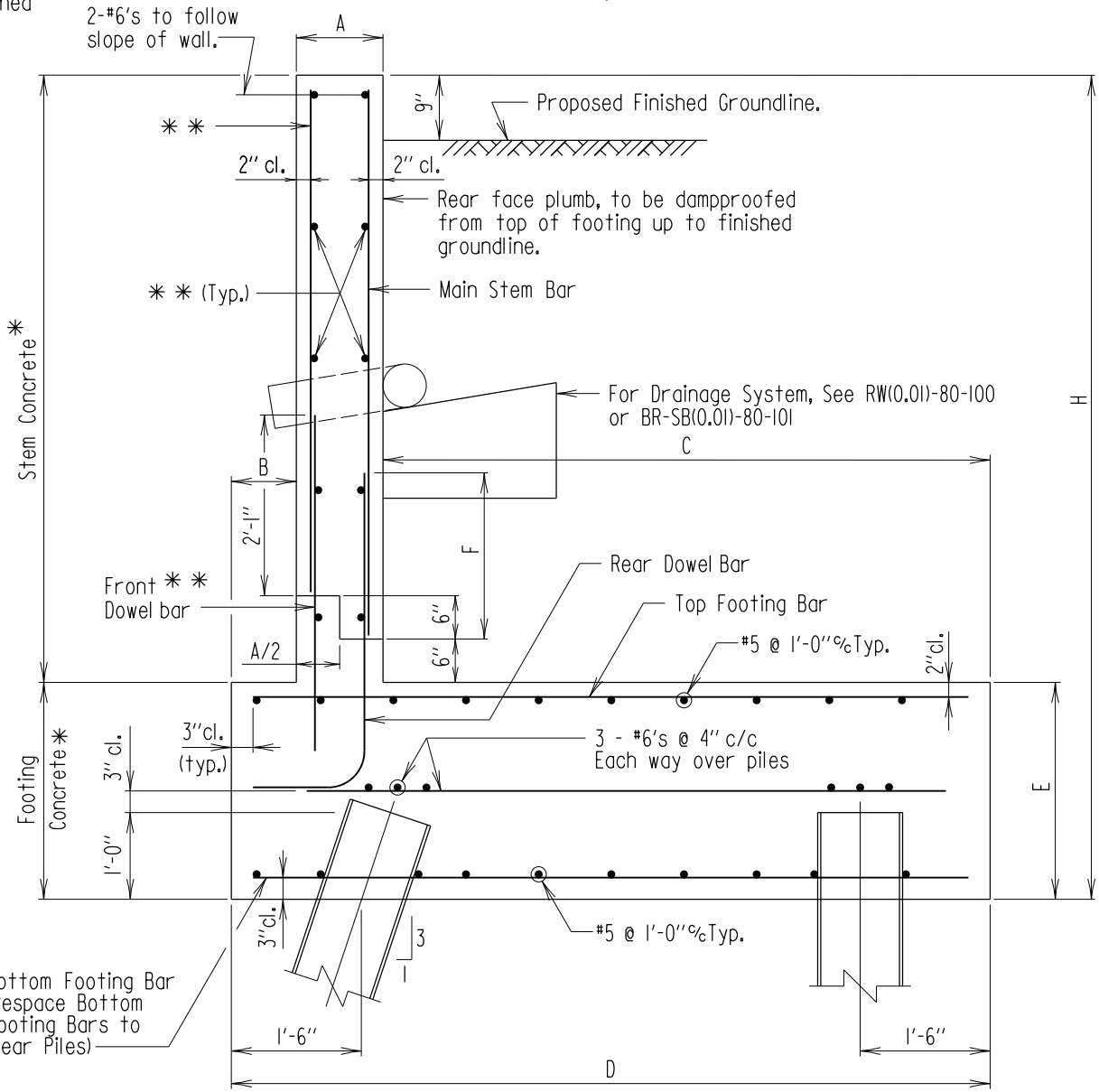


DETAIL A

Scale: None

(See note no. 1 Sheet 2)

* * #4 @ 1'-6" c/c for
wall types G-I thru G-IV
#4 @ 1'-0" c/c for
wall types G-V thru G-VIII



TYPICAL SECTION

Scale: 1/2" = 1'-0"

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

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TYPE G RETAINING WALL SECTION (FOR PILE FOOTING AND TWO FOOT SURCHARGE)

STANDARD NO. RW(6.09)-02-343 SHEET 1 OF 2

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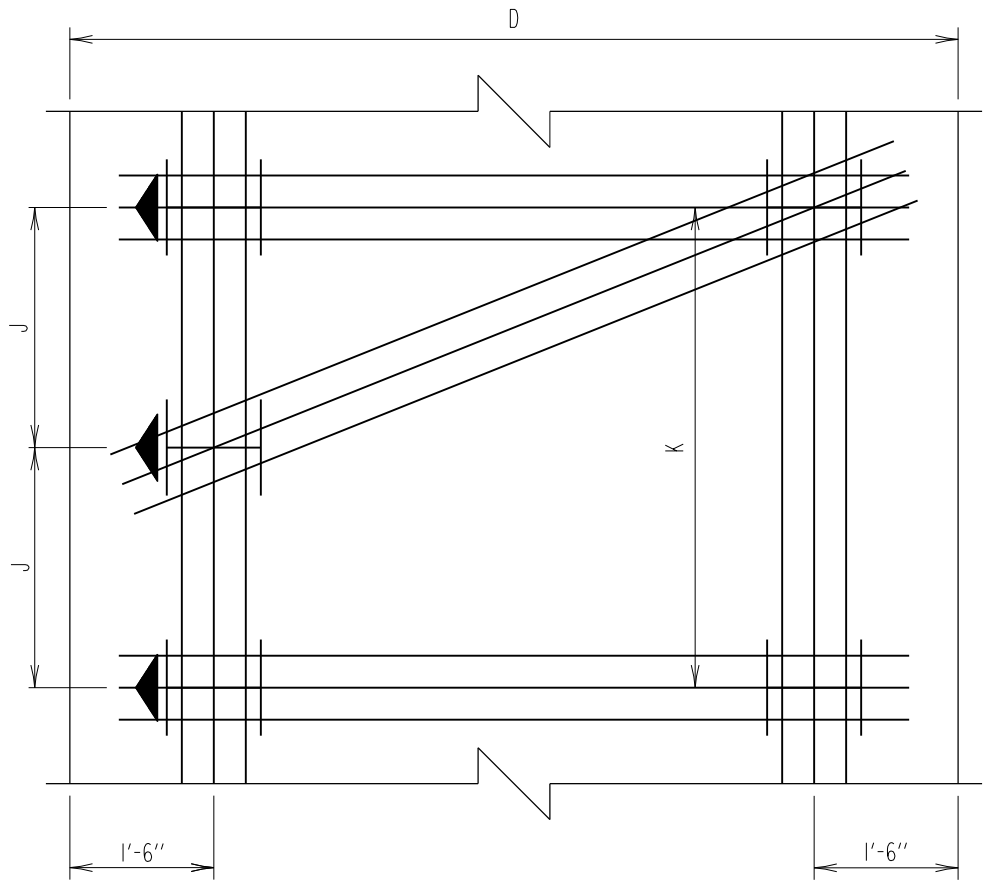
FHWA APPROVAL
DATE: .

RETAINING WALLS



TYPICAL PILE PLAN
Scale: 1/2" = 1'-0"

Notes:
1. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
2. Contractor has option of lapping stem reinforcement with toe reinforcement and/or dowels as shown; or by extending the toe and/or dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
3. H piles shown for illustration purpose only. For pile type, see Pile Layout on pertinent Contract Drawing.
4. Pile spacings are maximum. For actual pile spacing, see Pile Layout on pertinent contract drawing.
5. These walls are valid if traffic is present on the level area adjacent to the wall.

Wall Type	H	A	B	C	D	E	Rear Dowel Bar	Main Stem Bar	Top Footing Bar	Bottom Footing Bar	F	PILE CAPACITY - DESIGN LOAD							
												25 TONS		40 TONS		55 TONS		70 TONS	
												J	K	J	K	J	K	J	K
G-I	6'-0"	1'-0"	0'-9"	4'-3"	6'-0"	2'-3"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	2'-2"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
G-II	8'-0"	1'-0"	0'-9"	4'-3"	6'-0"	2'-3"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 1'-0"	2'-2"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
G-III	10'-0"	1'-0"	0'-9"	4'-3"	6'-0"	2'-3"	#5 @ 6"	#5 @ 1'-0"	#5 @ 6"	#5 @ 1'-0"	2'-2"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
G-IV	12'-0"	1'-0"	1'-0"	4'-3"	6'-3"	2'-3"	#7 @ 6"	#7 @ 1'-0"	#7 @ 6"	#7 @ 1'-0"	3'-0"	4'-3"	8'-6"	4'-9"	9'-6"	4'-9"	9'-6"	4'-9"	9'-6"
G-V	14'-0"	1'-3"	1'-6"	4'-3"	7'-0"	2'-3"	#7 @ 6"	#7 @ 1'-0"	#7 @ 6"	#7 @ 1'-0"	3'-0"	3'-0"	6'-0"	4'-6"	9'-0"	4'-6"	9'-0"	4'-6"	9'-0"
G-VI	16'-0"	1'-6"	1'-9"	4'-3"	7'-6"	2'-6"	#7 @ 6"	#7 @ 1'-0"	#7 @ 6"	#7 @ 1'-0"	3'-6"			4'-0"	8'-0"	4'-6"	9'-0"	4'-6"	9'-0"
G-VII	18'-0"	1'-9"	2'-3"	4'-3"	8'-3"	2'-6"	#8 @ 6"	#8 @ 1'-0"	#8 @ 6"	#8 @ 1'-0"	3'-6"			3'-0"	6'-0"	4'-3"	8'-6"	4'-3"	8'-6"
G-VIII	20'-0"	2'-0"	2'-6"	4'-3"	8'-9"	2'-9"	#8 @ 6"	#8 @ 1'-0"	#8 @ 6"	#8 @ 1'-0"	4'-7"					3'-6"	7'-0"	4'-3"	8'-6"

FHWA APPROVAL
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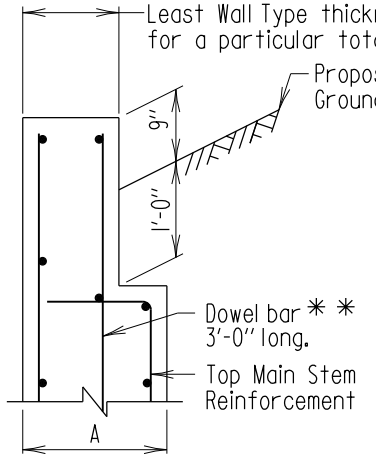
TYPE G RETAINING WALL SECTION (FOR PILE FOOTING AND TWO FOOT SURCHARGE)

STANDARD NO. RW6.09-02-343

SHEET 2 OF 2

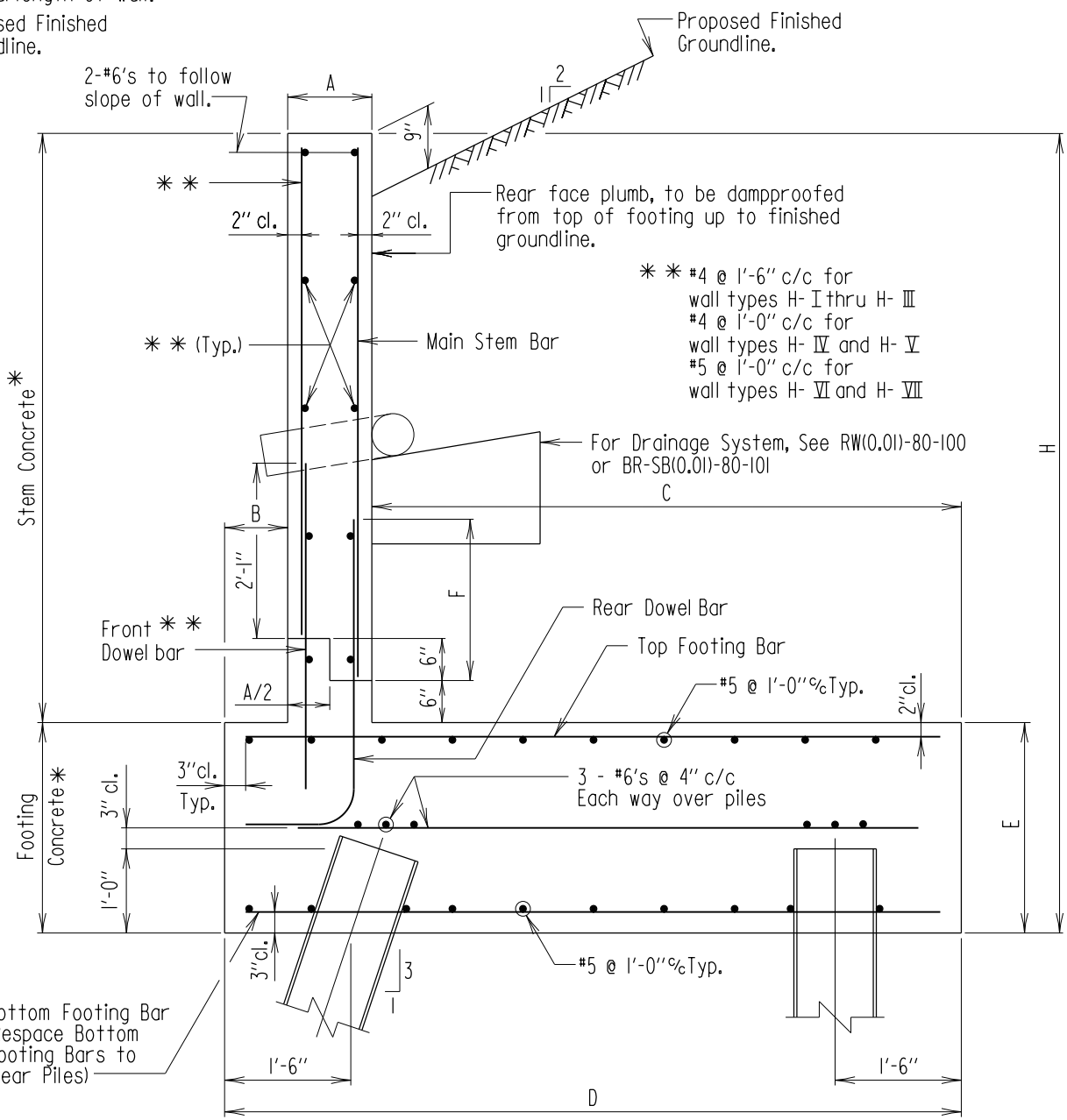
RETAINING WALLS



DETAIL A

Scale: None

(See note no. 1 Sheet 2)



TYPICAL SECTION

Scale: 1/2" = 1'-0"

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

FHWA APPROVAL
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DATE: 7-16-02

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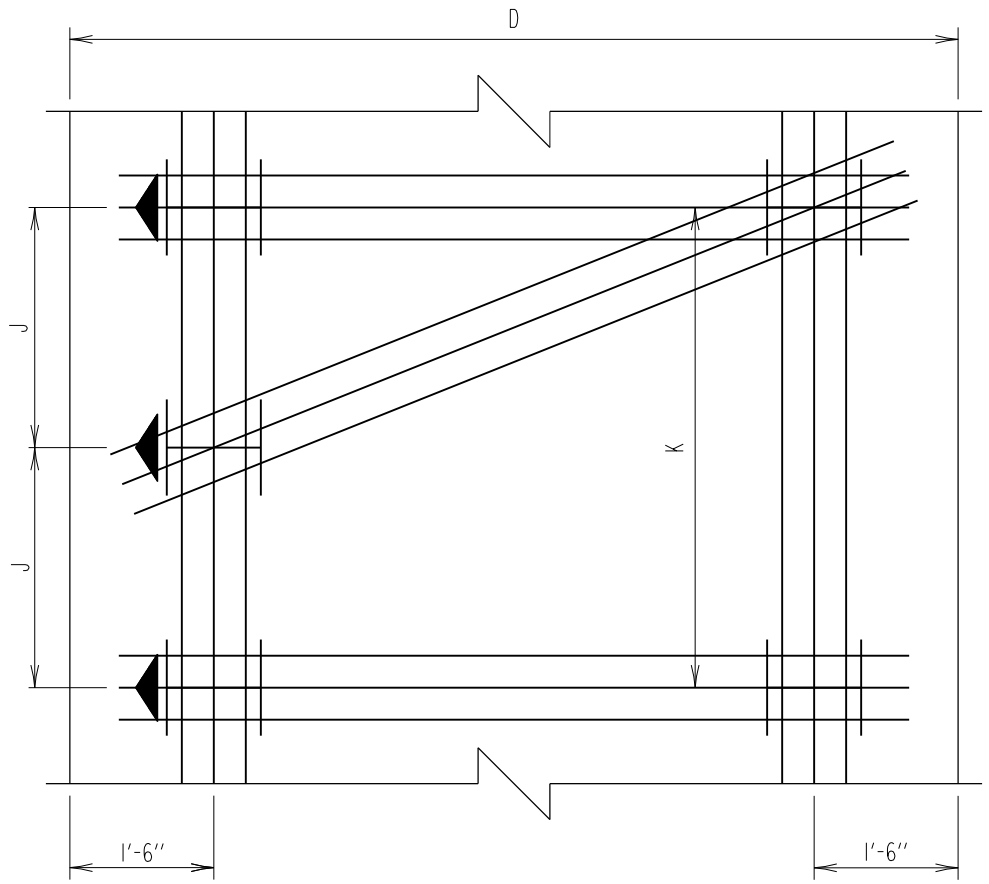
VERIFIED 11-13-2007 LRFD

TYPE H RETAINING WALL SECTION (FOR PILE FOOTING AND SLOPING GROUNDLINE)

STANDARD NO. RW(6.10)-02-344(L) SHEET 1 OF 2

RETAINING WALLS



TYPICAL PILE PLAN

Scale: 1/2" = 1'-0"

Notes:

1. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
2. Contractor has option of lapping stem reinforcement with toe reinforcement and/or dowels as shown; or by extending the toe and/or dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
3. These walls are valid if the sloping backfill levels off and traffic is present on the level area.
4. H piles shown for illustration purpose only. For pile type, see Pile Layout on pertinent Contract Drawing.
5. Pile spacings are maximum. For actual pile spacing, see Pile Layout on pertinent Contract Drawing.
6. Capacities include resistance factors (LRFD only).

Wall Type	H	A	B	C	D	E	Rear Dowel Bar	Main Stem Bar	Top Footing Bar	Bottom Footing Bar	F	PILE CAPACITY - DESIGN LOAD							
												25 TONS		40 TONS		55 TONS		70 TONS	
												J	K	J	K	J	K	J	K
H-I	6'-0"	1'-0"	9"	4'-3"	6'-0"	2'-3"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 6"	#5 @ 1'-0"	2'-2"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
H-II	8'-0"	1'-0"	1'-6"	4'-3"	6'-9"	2'-3"	#6 @ 1'-0"	#6 @ 1'-0"	#6 @ 6"	#6 @ 1'-0"	3'-0"	3'-6"	7'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
H-III	10'-0"	1'-0"	2'-0"	4'-3"	7'-3"	2'-6"	#7 @ 1'-0"	#7 @ 1'-0"	#7 @ 6"	#7 @ 1'-0"	3'-6"			4'-0"	8'-0"	4'-0"	8'-0"	4'-0"	8'-0"
H-IV	12'-0"	1'-3"	2'-6"	4'-3"	8'-0"	2'-6"	#8 @ 1'-0"	#8 @ 1'-0"	#8 @ 6"	#8 @ 1'-0"	4'-7"					4'-0"	8'-0"	4'-0"	8'-0"
H-V	14'-0"	1'-9"	3'-0"	4'-3"	9'-0"	2'-6"	#8 @ 6"	#8 @ 1'-0"	#8 @ 6"	#8 @ 1'-0"	4'-7"					3'-0"	6'-0"	3'-9"	7'-6"
H-VI	16'-0"	2'-0"	3'-6"	4'-3"	9'-9"	2'-6"	#8 @ 6"	#8 @ 1'-0"	#8 @ 6"	#8 @ 1'-0"	4'-7"							3'-0"	6'-0"
H-VII	18'-0"	2'-6"	4'-0"	4'-3"	10'-9"	2'-6"	#8 @ 6"	#8 @ 1'-0"	#8 @ 6"	#8 @ 6"	4'-7"								

APPROVAL

OFFICE OF STRUCTURES DIRECTOR

DATE: 7/16/02

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DATE: .

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
OFFICE OF STRUCTURES

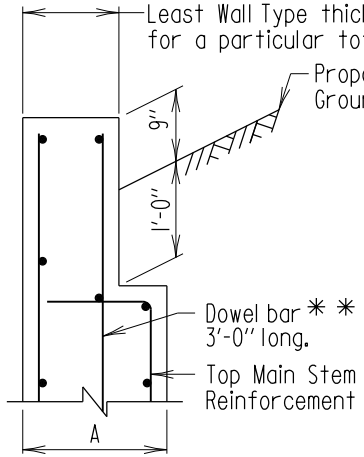
TYPE H RETAINING WALL SECTION (FOR PILE FOOTING AND SLOPING GROUNDLINE)

VERIFIED 11-13-2007 LRFD

STANDARD NO. RW6.10)-02-344(L)

SHEET 2 OF 2

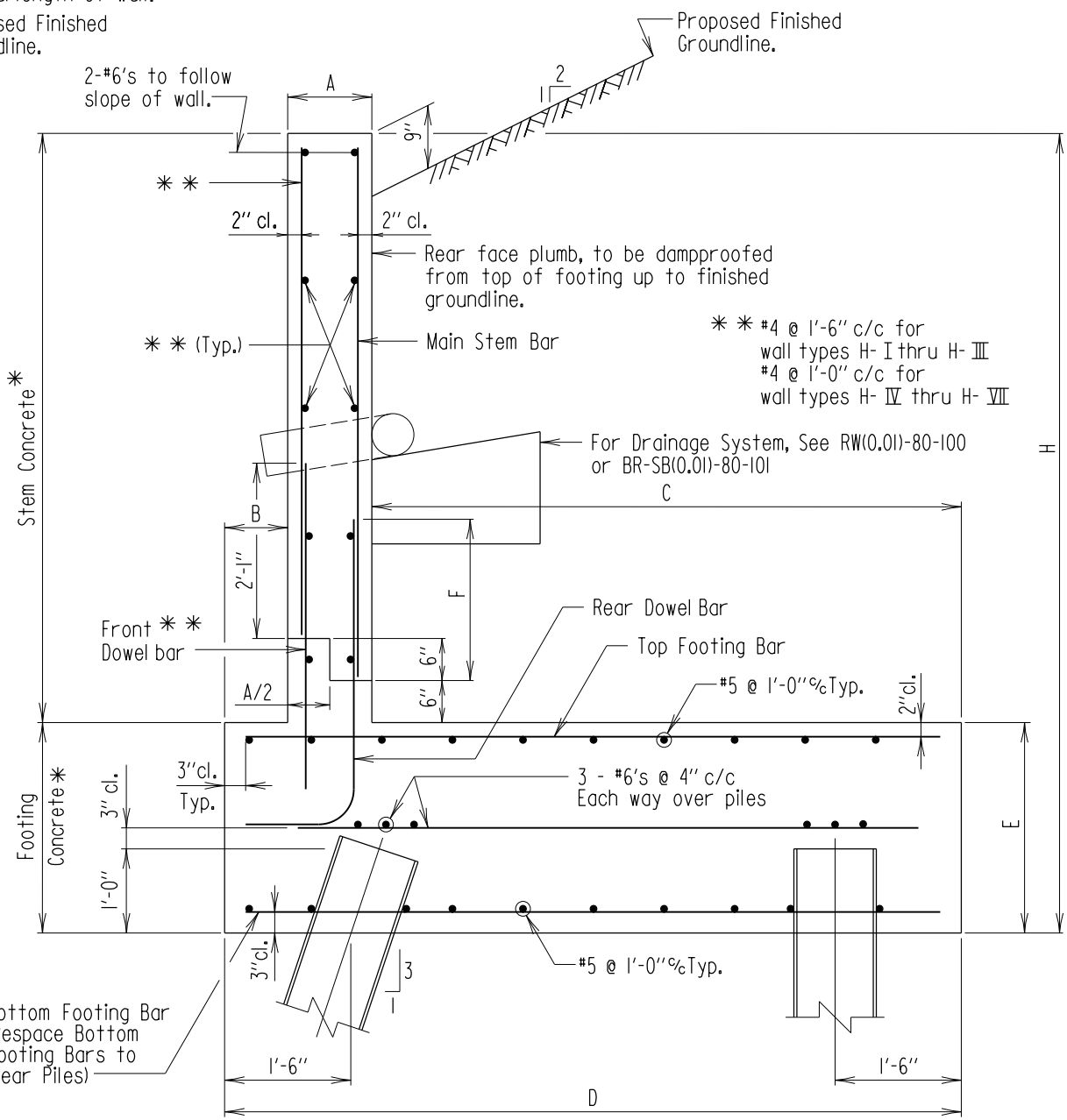
RETAINING WALLS



DETAIL A

Scale: None

(See note no. 1 Sheet 2)



TYPICAL SECTION

Scale: 1/2" = 1'-0"

* Where specific footing concrete and stem concrete items are included in the Proposal for a particular wall, these shall be the pay limits. Where no specific items have been set up in the Proposal, the cost of wall shall be included in the main structure Contract price, i.e.; box culvert, (where wings are included in box culvert item),; retaining wall, (where no separate pay items are established), etc.

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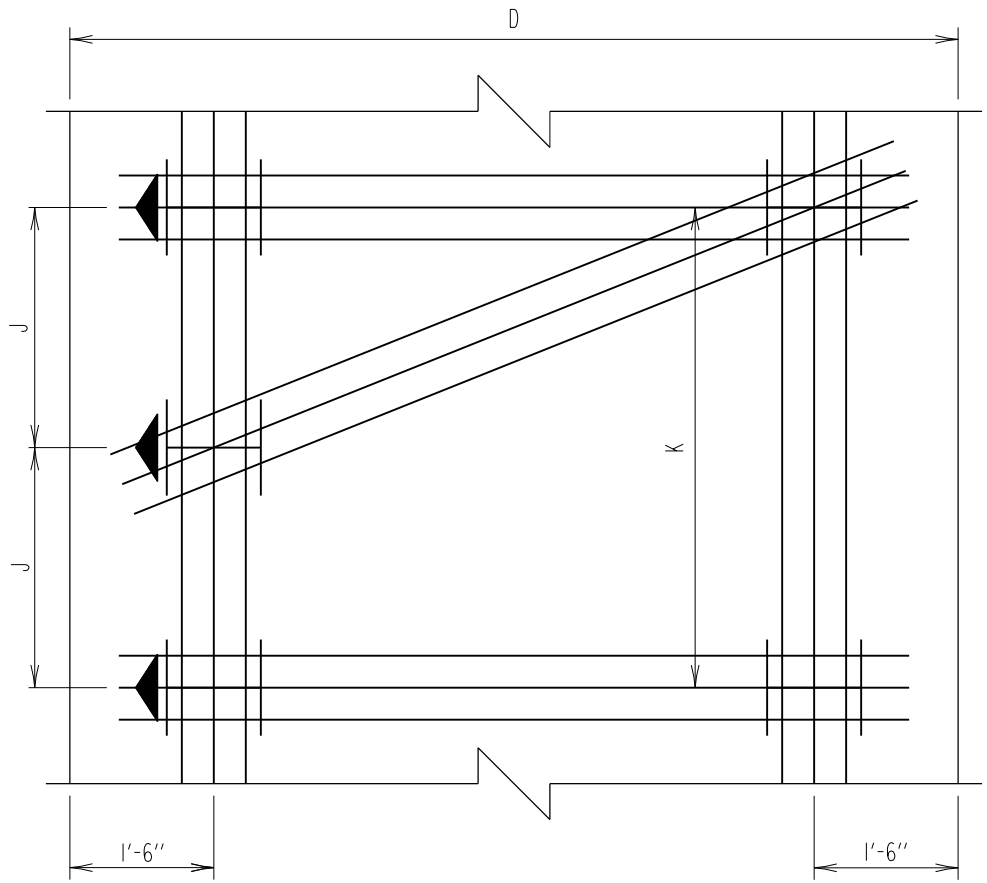
TYPE H RETAINING WALL SECTION (FOR PILE FOOTING AND SLOPING GROUNDLINE)

STANDARD NO. RW(6.10)-02-344

SHEET 1 OF 2

RETAINING WALLS



TYPICAL PILE PLAN
Scale: 1/2" = 1'-0"

Notes:
1. If in the length of a wall the type of wall changes and provides for a different thickness of stem, then "Detail A" shall be used for all walls of greater than the least wall thickness.
2. Contractor has option of lapping stem reinforcement with toe reinforcement and/or dowels as shown; or by extending the toe and/or dowel reinforcement with no splicing. However, no additional compensation to Contractor will be allowed for whichever alternative is selected.
3. These walls are valid if the sloping backfill levels off and traffic is present on the level area.
4. H piles shown for illustration purpose only. For pile type, see Pile Layout on pertinent Contract Drawing.
5. Pile spacings are maximum. For actual pile spacing, see Pile Layout on pertinent Contract Drawing.

Wall Type	H	A	B	C	D	E	Rear Dowel Bar	Main Stem Bar	Top Footing Bar	Bottom Footing Bar	F	PILE CAPACITY - DESIGN LOAD							
												25 TONS		40 TONS		55 TONS		70 TONS	
												J	K	J	K	J	K	J	K
H-I	6'-0"	1'-0"	9"	4'-3"	6'-0"	2'-3"	#5 @ 1'-0"	#5 @ 1'-0"	#5 @ 6"	#5 @ 1'-0"	2'-2"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
H-II	8'-0"	1'-0"	1'-6"	4'-3"	6'-9"	2'-3"	#6 @ 1'-0"	#6 @ 1'-0"	#6 @ 6"	#6 @ 1'-0"	3'-0"	4'-6"	9'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
H-III	10'-0"	1'-0"	2'-0"	4'-3"	7'-3"	2'-6"	#7 @ 1'-0"	#7 @ 1'-0"	#7 @ 6"	#7 @ 1'-0"	3'-6"	3'-6"	7'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
H-IV	12'-0"	1'-3"	2'-6"	4'-3"	8'-0"	2'-6"	#8 @ 1'-0"	#8 @ 1'-0"	#8 @ 6"	#8 @ 1'-0"	4'-7"			3'-9"	7'-6"	5'-0"	10'-0"	5'-0"	10'-0"
H-V	14'-0"	1'-9"	3'-0"	4'-3"	9'-0"	2'-6"	#8 @ 6"	#8 @ 1'-0"	#8 @ 6"	#8 @ 1'-0"	4'-7"			3'-0"	6'-0"	4'-0"	8'-0"	4'-9"	9'-6"
H-VI	16'-0"	2'-0"	3'-6"	4'-3"	9'-9"	2'-6"	#8 @ 6"	#8 @ 1'-0"	#8 @ 6"	#8 @ 1'-0"	4'-7"					3'-0"	6'-0"	4'-0"	8'-0"
H-VII	18'-0"	2'-6"	4'-0"	4'-3"	10'-9"	2'-6"	#8 @ 6"	#8 @ 1'-0"	#8 @ 6"	#8 @ 6"	4'-7"							3'-3"	6'-6"

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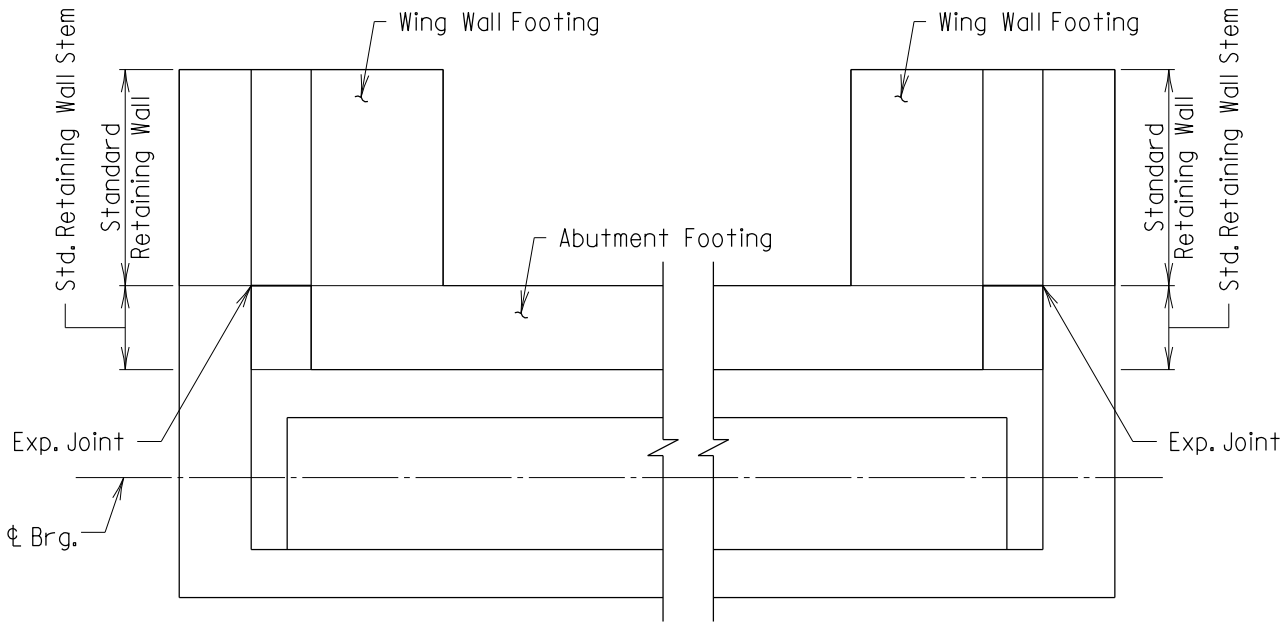
TYPE H RETAINING WALL SECTION (FOR PILE FOOTING AND SLOPING GROUNDLINE)

STANDARD NO. RW6.10-02-344

SHEET 2 OF 2

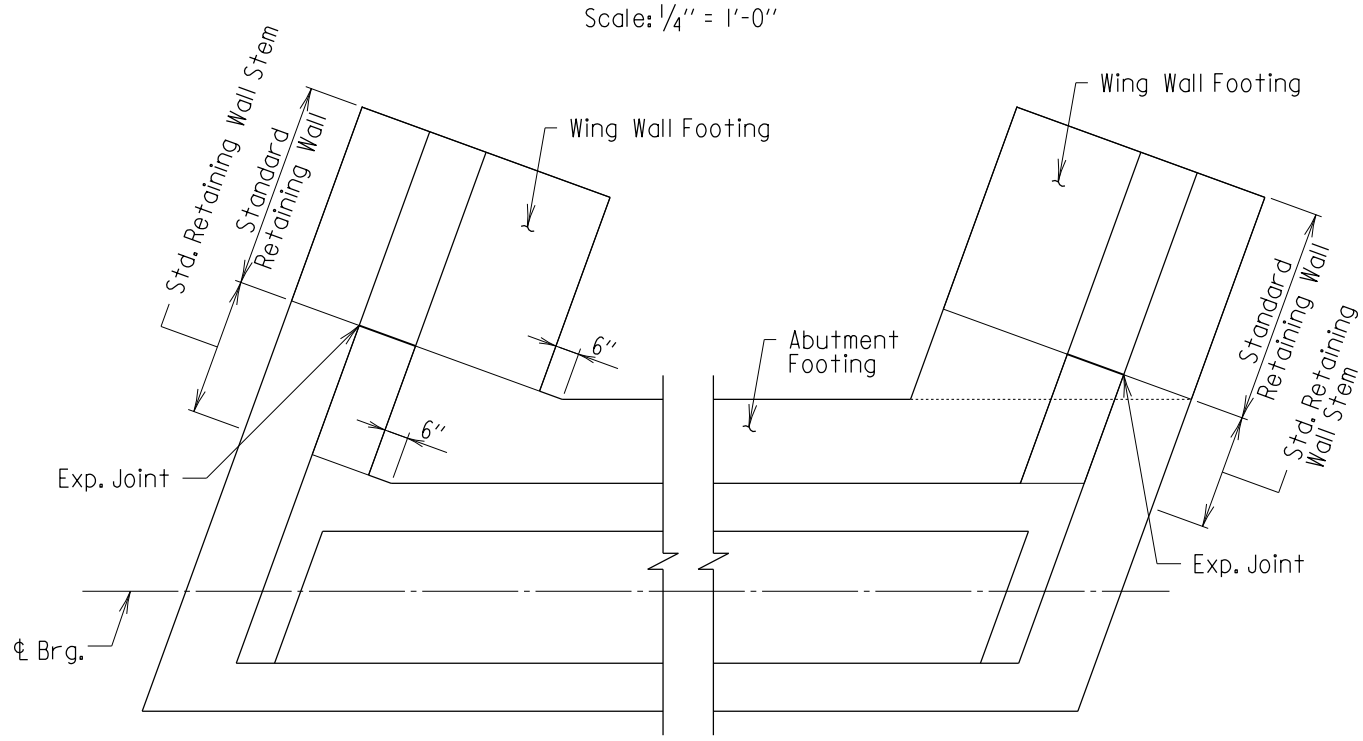
RETAINING WALLS

GUIDE FOR ABUTMENT AND WING WALL FOOTING INTERSECTION



90° ABUTMENT

Scale: 1/4" = 1'-0"



SKEWED ABUTMENT

Scale: 1/4" = 1'-0"

Note:
For additional details of expansion joint refer to BR-SB(6.18)-88-196

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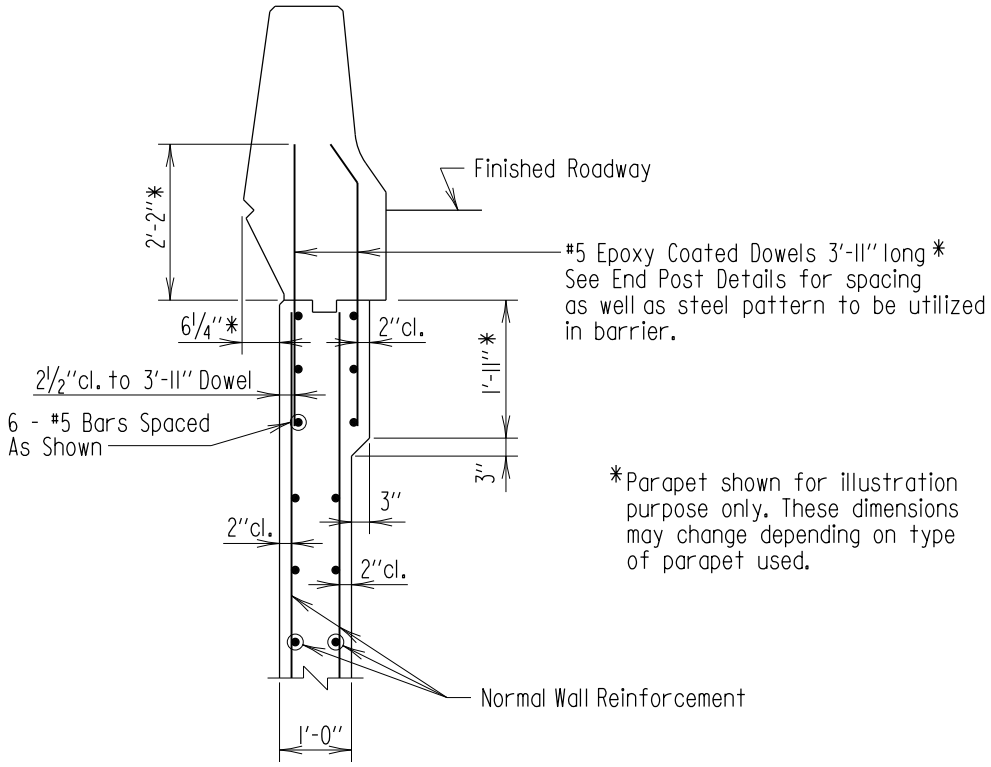
STANDARD RETAINING WALL
STANDARD DETAILS

STANDARD NO. RW(6.11)-02-345

SHEET 1 OF 2

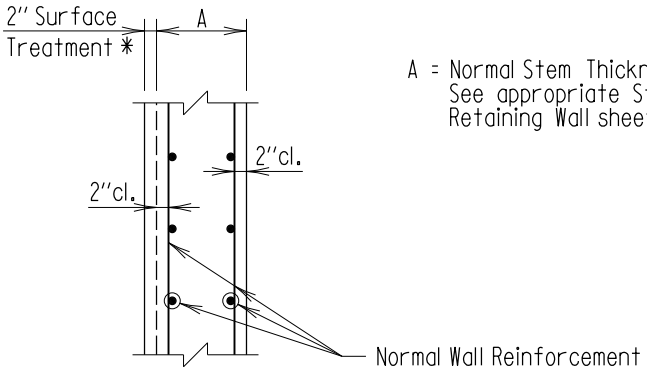
RETAINING WALLS



*Parapet shown for illustration purpose only. These dimensions may change depending on type of parapet used.

GUIDE FOR PARAPET ATTACHMENT FOR WALLS WITH 1'-0" STEM THICKNESS

Scale: 3/8" = 1'-0"



A = Normal Stem Thickness, See appropriate Standard Retaining Wall sheet

*Thickness may vary depending on type of surface treatment used.

GUIDE FOR WALLS WITH AESTHETIC SURFACE TREATMENT

Scale: 3/8" = 1'-0"

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STANDARD RETAINING WALL STANDARD DETAILS

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STANDARD NO. RW(6.11)-02-345

SHEET 2 OF 2

RETAINING WALLS